

SLIM PHASE 4  
DGR - Dual Gamma Ray

1 : 240

Country : USA		Field : Wattenberg		Location : Lat: 40° 7' 1.73" North Long: 104° 44' 26.37" West		Well : Gobbler 2C-23-HZ		Company : Anadarko Petroleum		Rig : Ensign 132		<div>Company : Anadarko Petroleum</div> <div>Rig : Ensign 132</div> <div>Well : Gobbler 2C-23-HZ</div> <div>Field : Wattenberg</div> <div>Country : USA</div> <div>API Number : 05-123-36816</div>			
LOCATION		Latitude : 40° 7' 1.73" North Longitude : 104° 44' 26.37" West		UTM Easting = 3,212,364.27 ft UTM Northing = 1,286,430.04 ft		Other Services Directional Drilling DDSR									
Permanent Datum : Ground Level		Elevation : 5094.00 ft		Elev. KB N/A		DF 5107.00 ft		GL 5094.00 ft		WD N/A					
Log Measured From : Drill Floor		13.00 ft Above Permanent Datum		MD LOG											
Drilling Measured From : Drill Floor															
Depth Logged : 7,850.00 ft To 11,968.00 ft		Unit No. : 11210429		Job No. : CA-XX-0900275968											
Date Logged : 04-May-13 To 12-May-13															
Total Depth MD : 11,968.00 ft TVD : 7,549.87 ft		Plot Type : Final													
Spud Date : 04-May-13		Plot Date : 12-May-13													
Run No.	Borehole Record (MD)		Run No.		Borehole Record (MD)										
	Size From To	Size From To		Size From To											
4	6.125 in	7.856.00 ft	11,968.00 ft												

Max Tool Temp (degF) / Source	163.20 / PCM	180.09 / PCM	229.65 / HCM		
Rm @ Max Tool Temp (degF)	N/A @ 163.20	N/A @ 180.09	N/A @ 229.65		
Lead MWD Engineer	Evan LeBlanc	Evan LeBlanc	Evan LeBlanc		
Customer Representative	Jason Laub	Jason Laub	Jason Laub		

## SENSOR INFORMATION

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	51.30	46.06	39.58		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341336	11341336	12121221		
Sonde Serial Number	10993273	10993273	10993273		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	252.54	181.07	83.02		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	DGR		
Distance From Bit (ft)	56.25	51.01	64.56		
Recorded Sample Period (sec)	10	10	8		
Software Version	8.15	8.15	N/A		
Sub Serial Number	11341336	11341336	223559		
Insert/Sonde Serial Number	11680968	11680968	10911224		

### DDSr-DGR Sensor Information

Tool Type	N/A	N/A	DDSr-DGR		
Distance From Bit (ft)	N/A	N/A	0		
Recorded Sample Period (sec)	N/A	N/A	12		
Software Version	N/A	N/A	10.88		
Sub Serial Number	N/A	N/A	223559		
Insert Serial Number	N/A	N/A	12203402		
Sensor ID Number	N/A	N/A	10497		

## REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. All main log data was logged while drilling
5. Environmental parameters used to process Gamma Ray are as follows:  
☐ Hole Size: 8.75" 6937-7921, 6.125" 7921-11968  
☐ Mud Density: 9.6 to 10.2 ppg
6. The following smoothing parameters have been applied to the data:  
☐ ROP: 0.5 ft interval, 1.2 ft coercion distance  
☐ All other curves: 0.5 ft interval, 0.6 ft coercion distance
7. Hole was logged from 6937-7921 using a PCGK and from 7921 to 11968 using a DGR tool

## WARRANTY

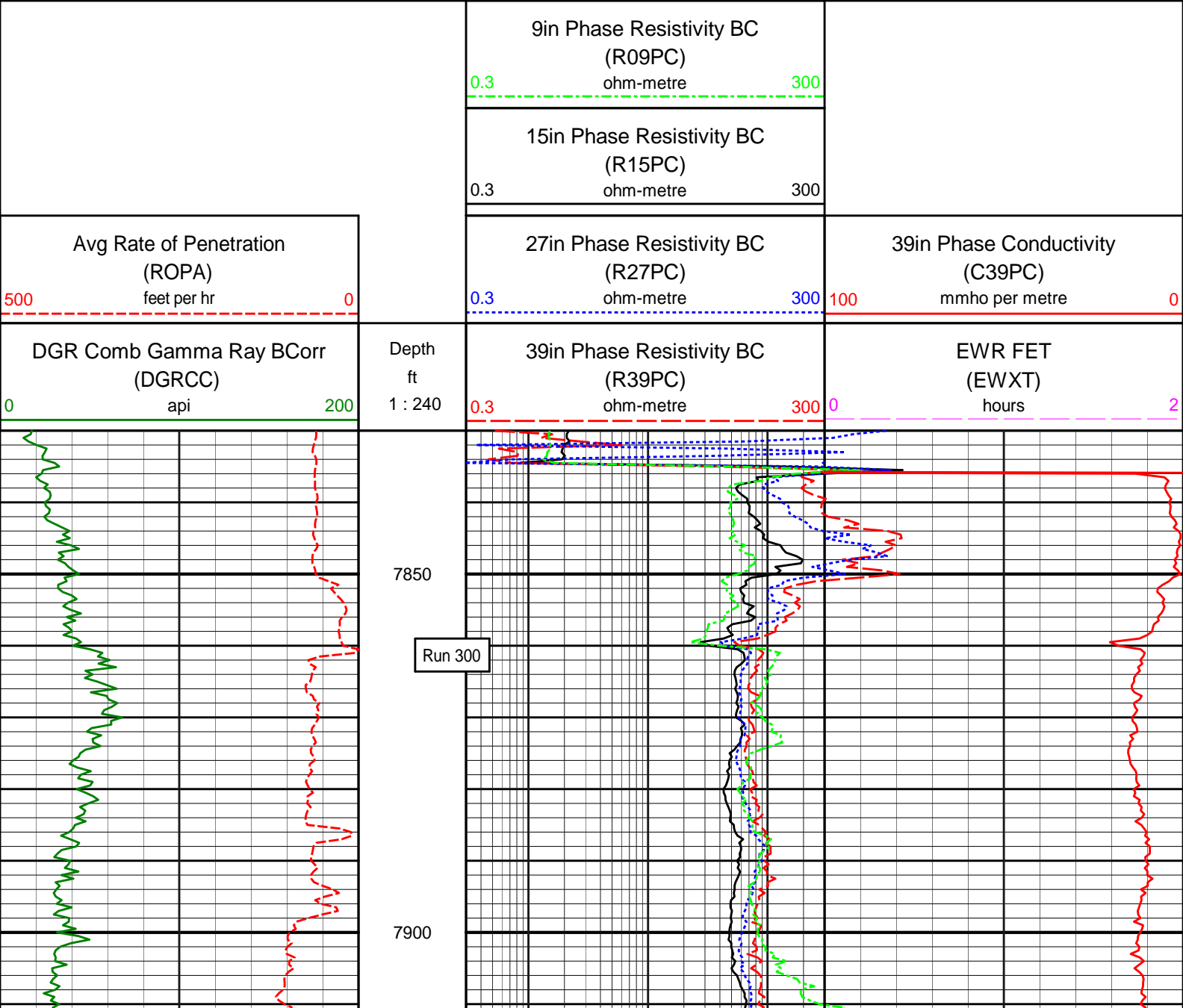
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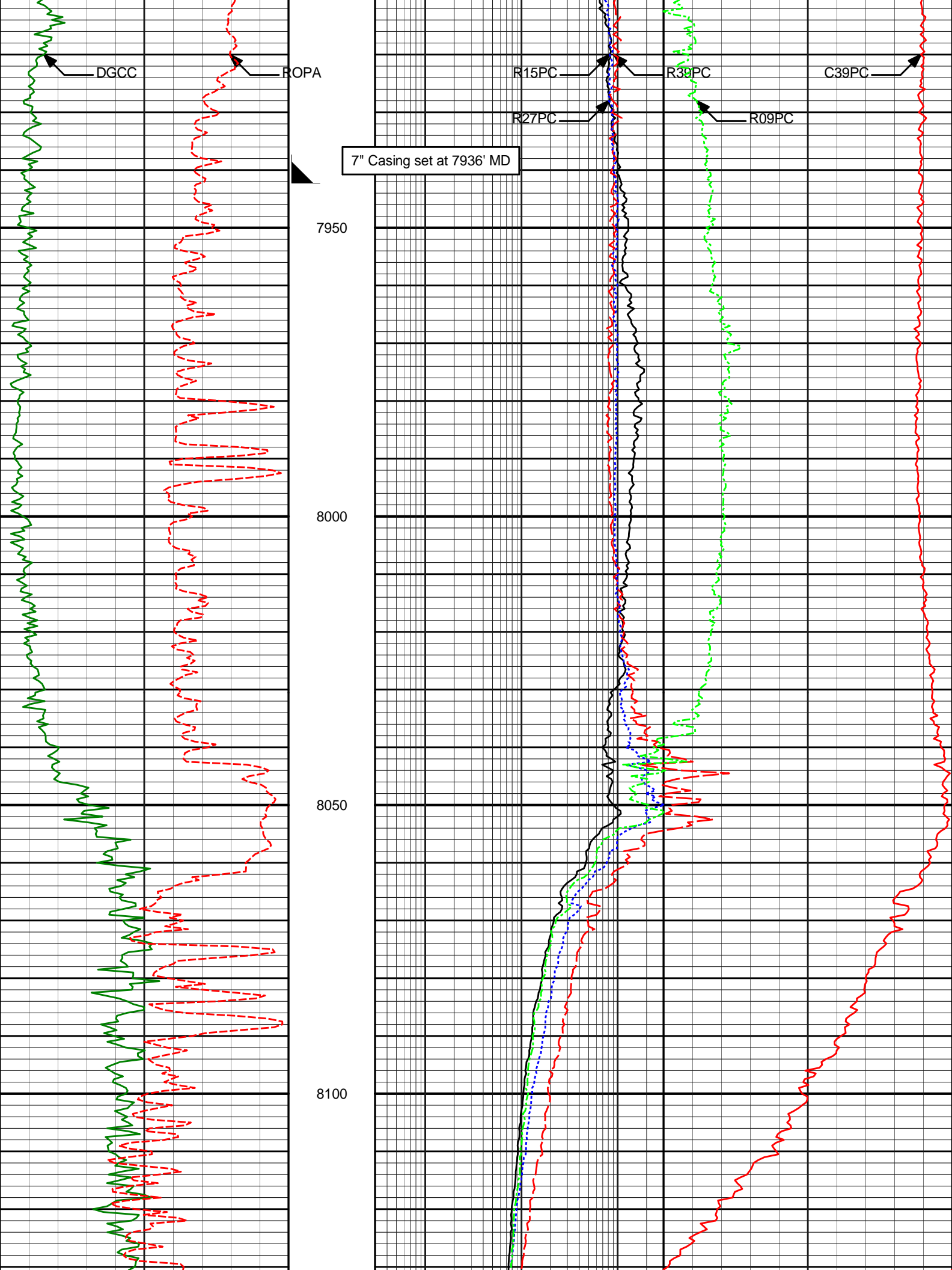
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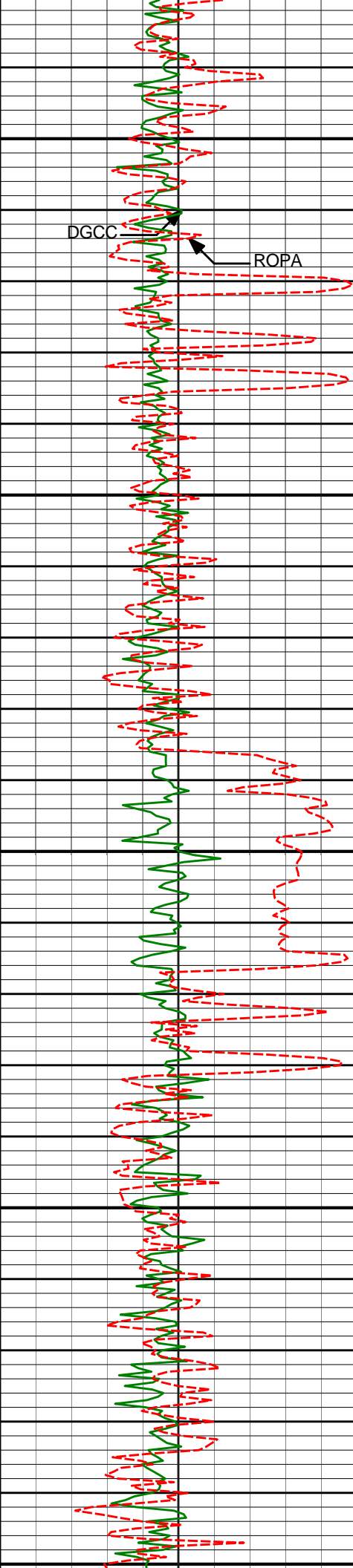
Sperry Drilling Services

MD Detail Log 1:240

Anadarko Petroleum Corp  
Gobbler 2N-23Hz  
Ensign 132  
2N 66W







8150

DGCC

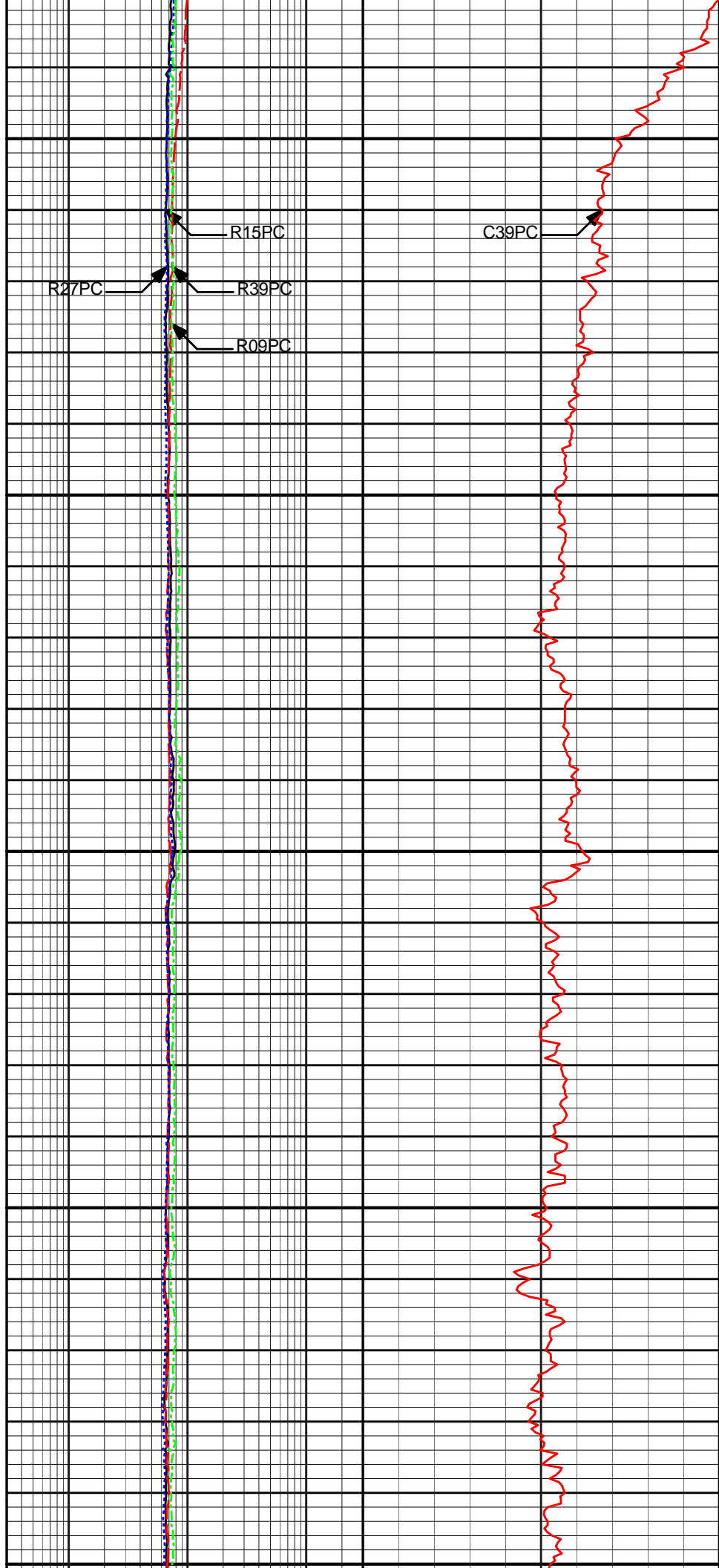
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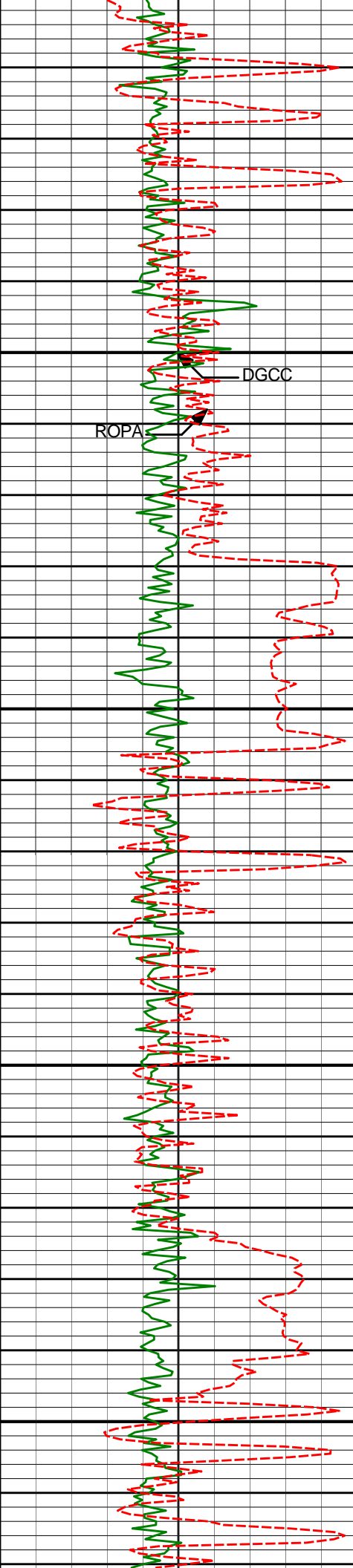
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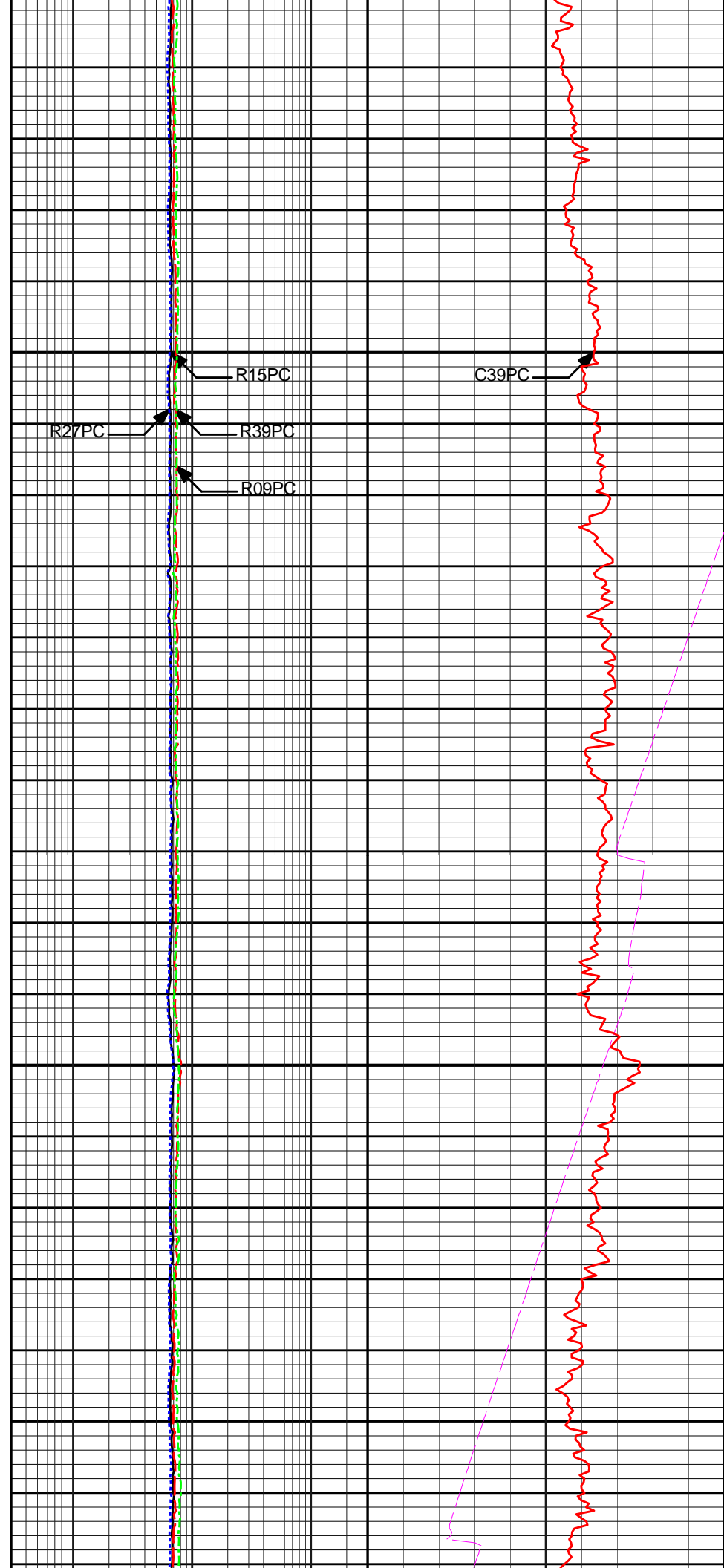
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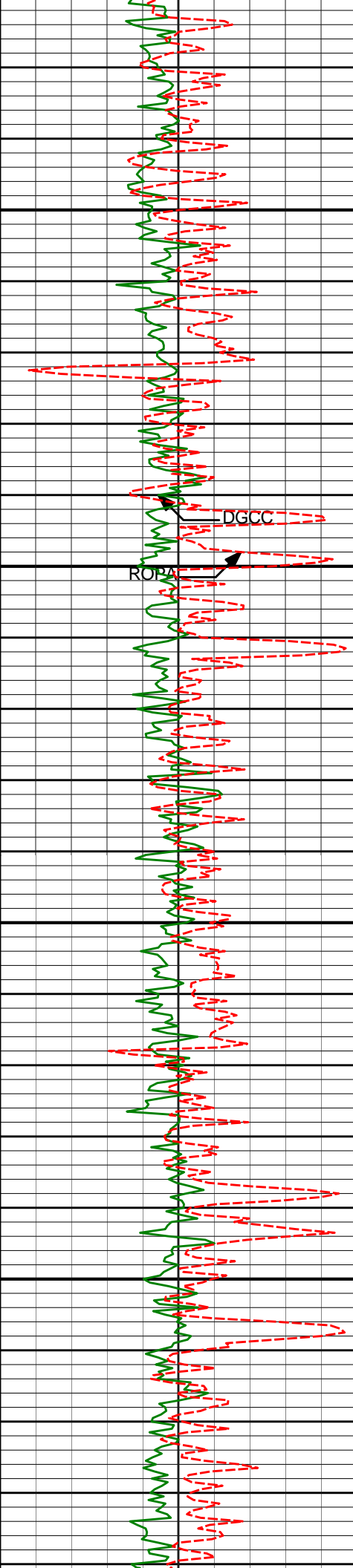
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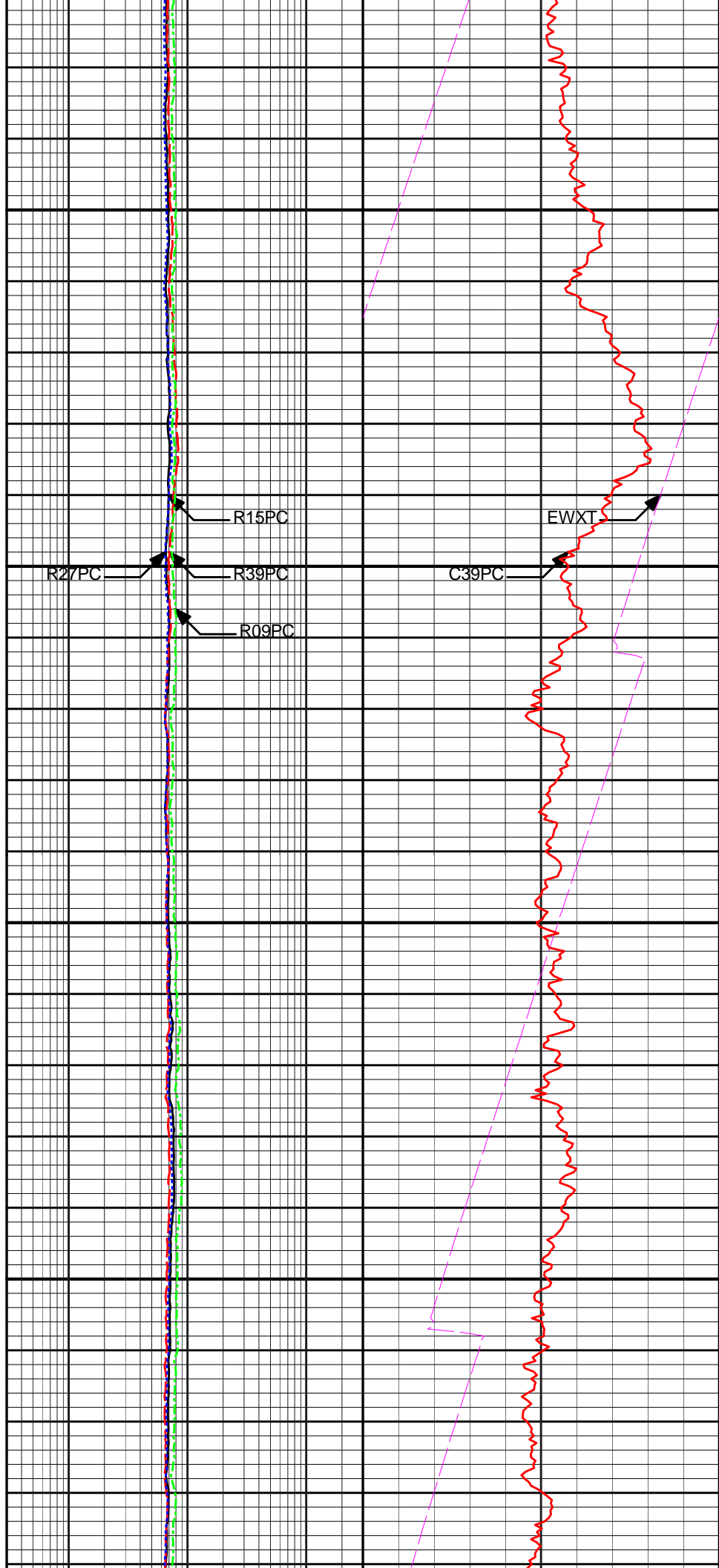


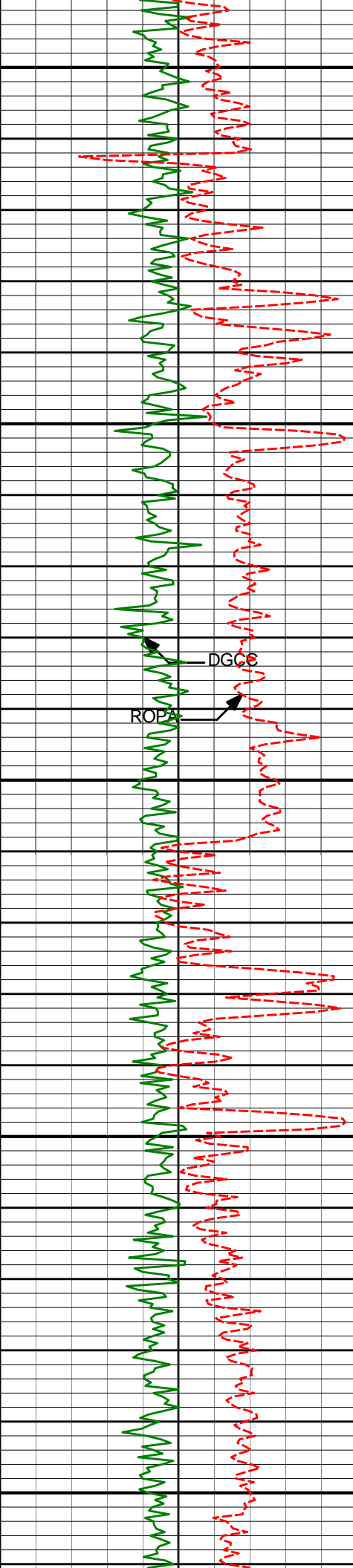
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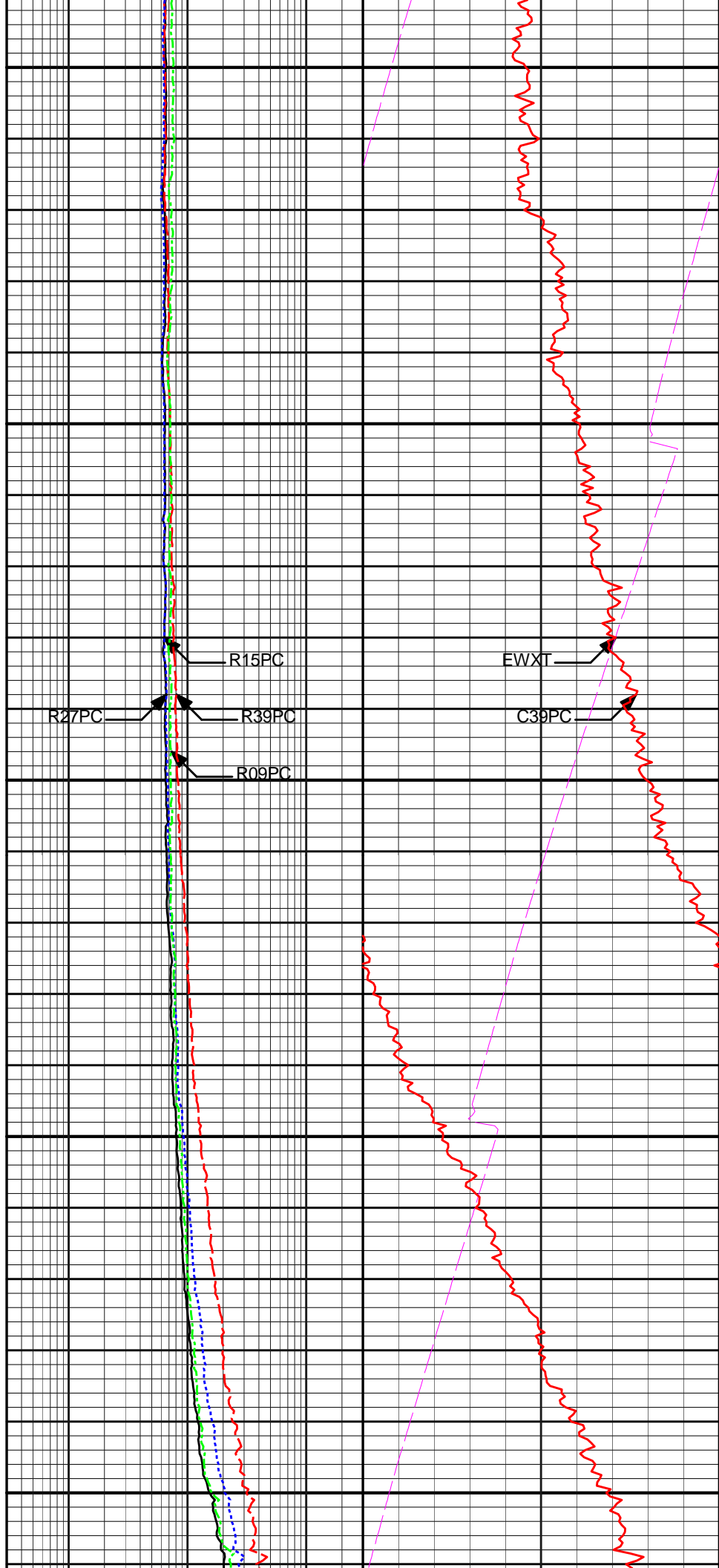
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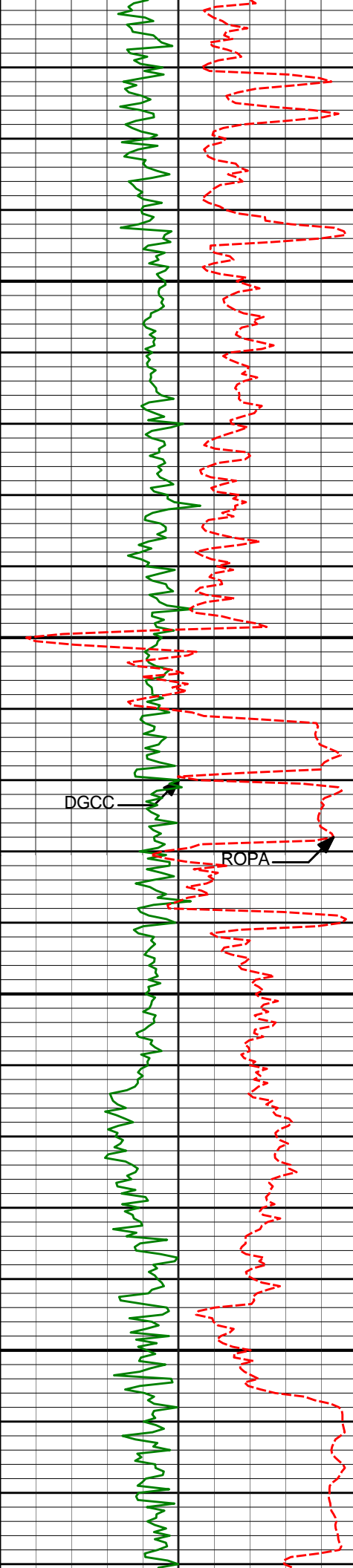
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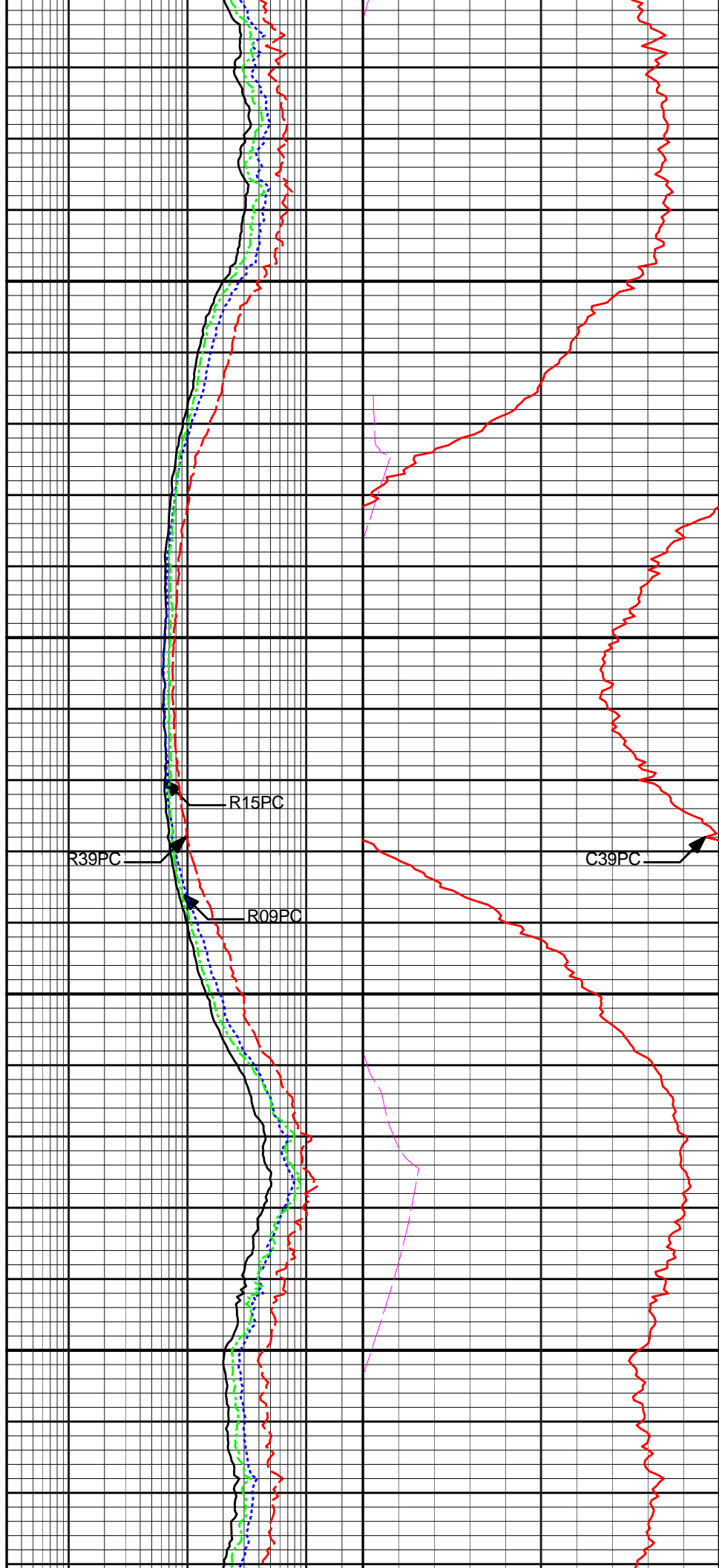


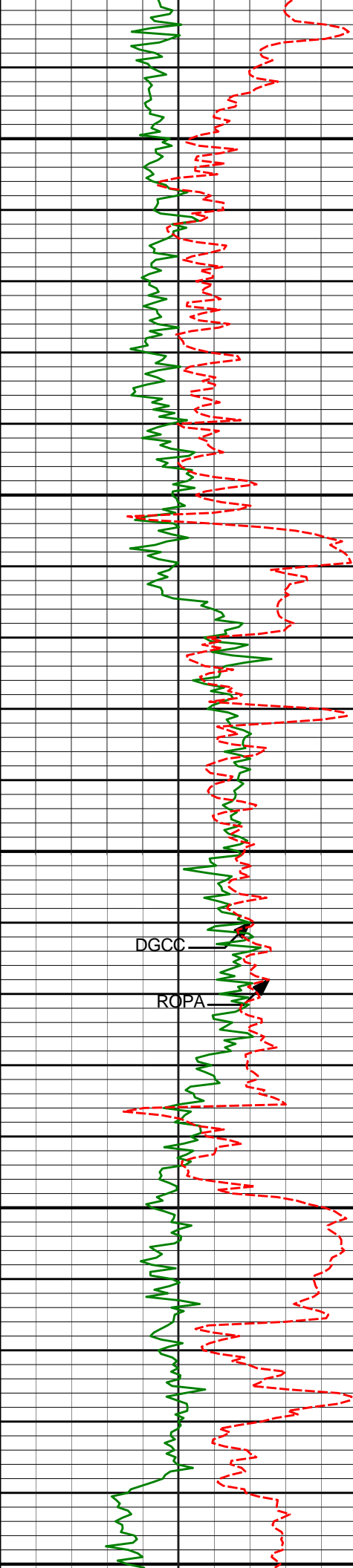
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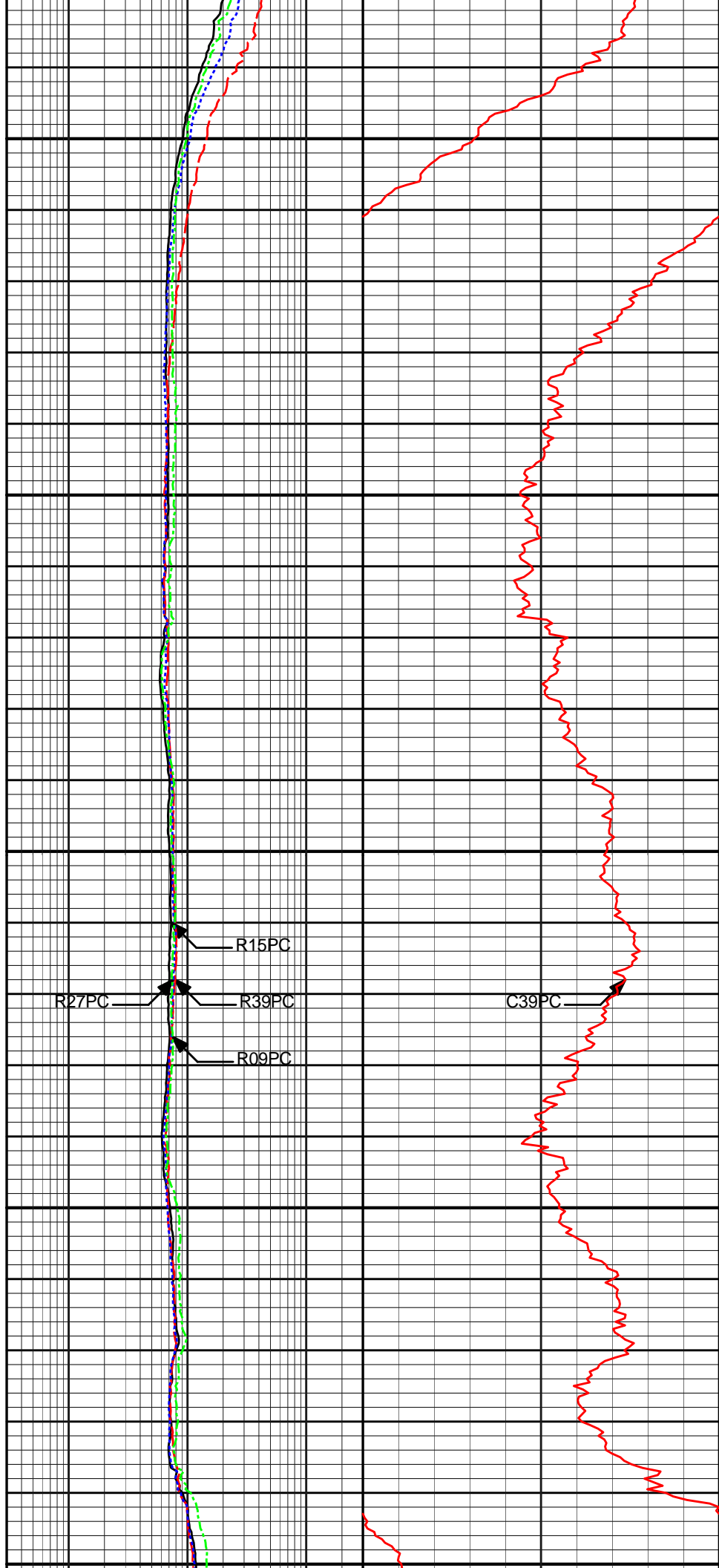
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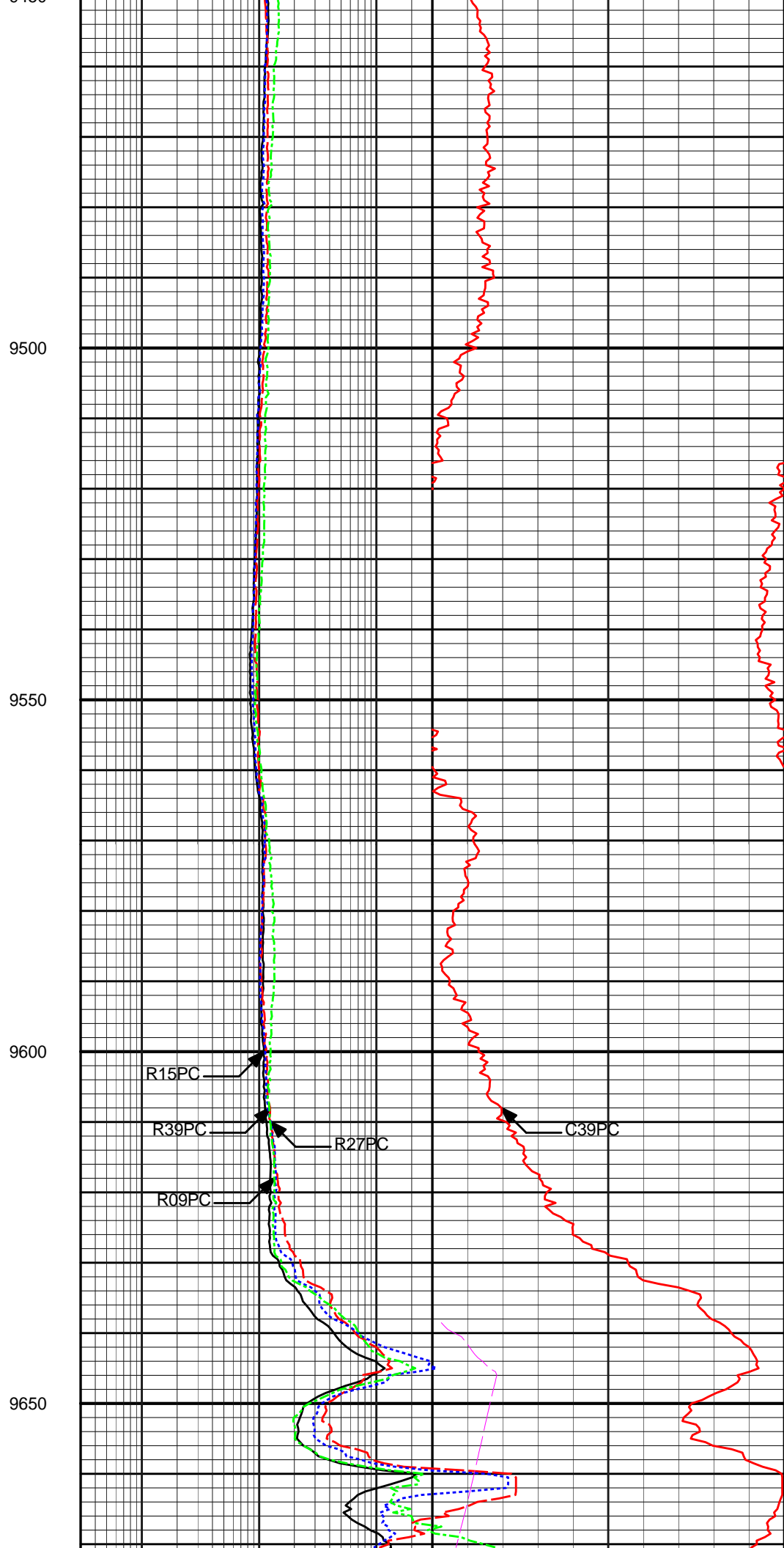
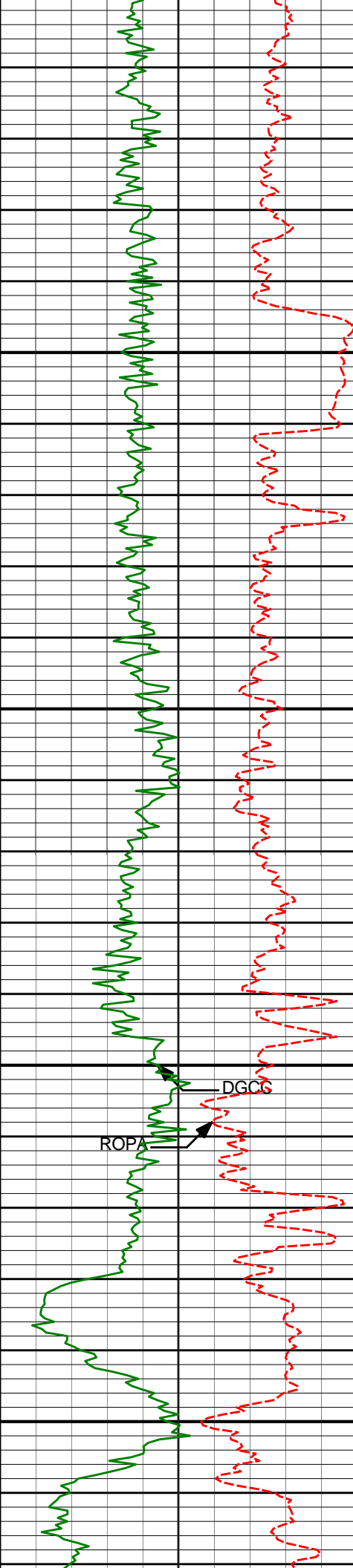
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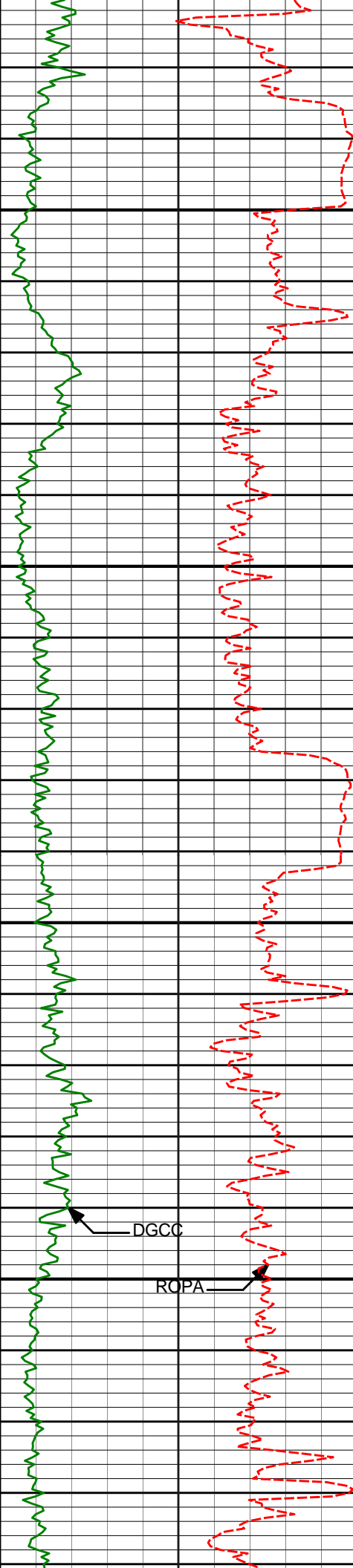
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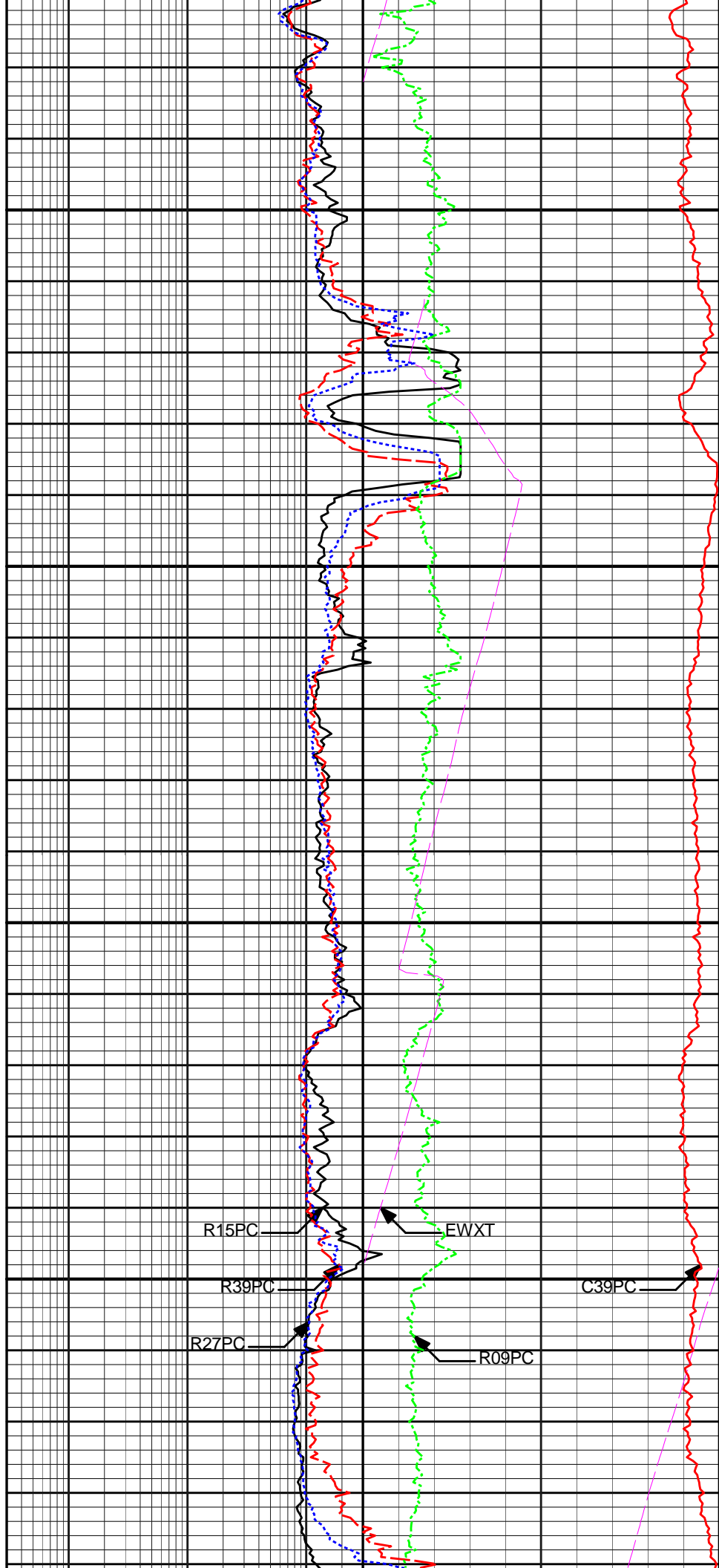
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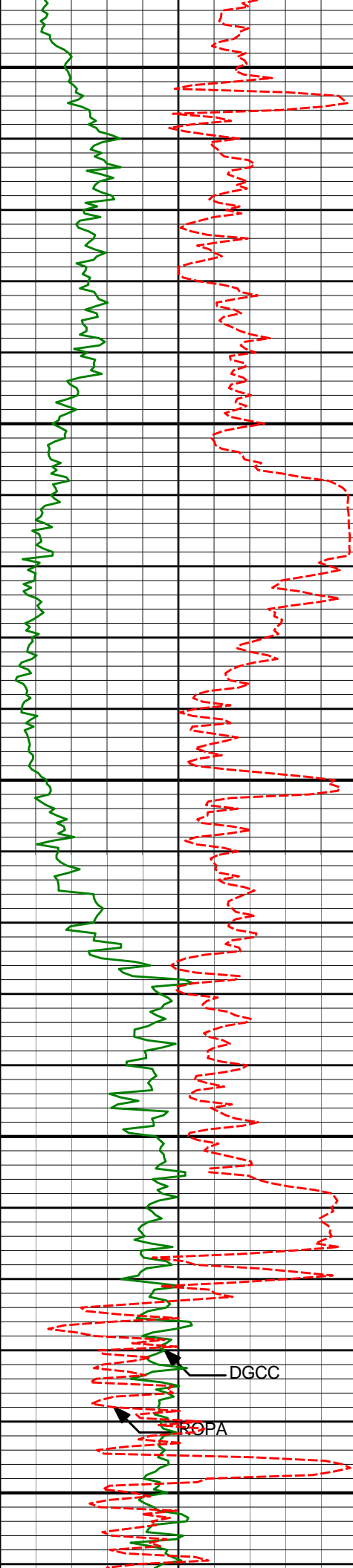
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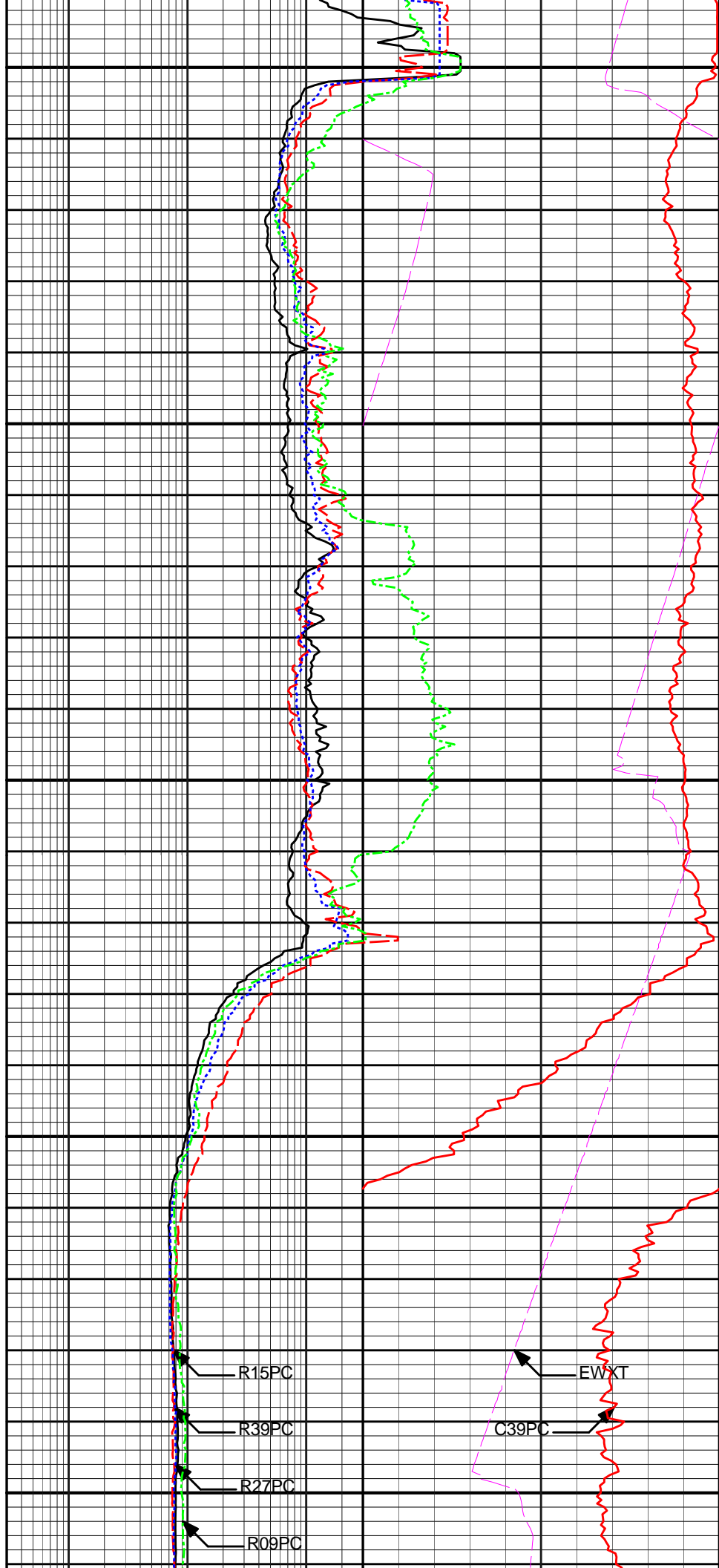
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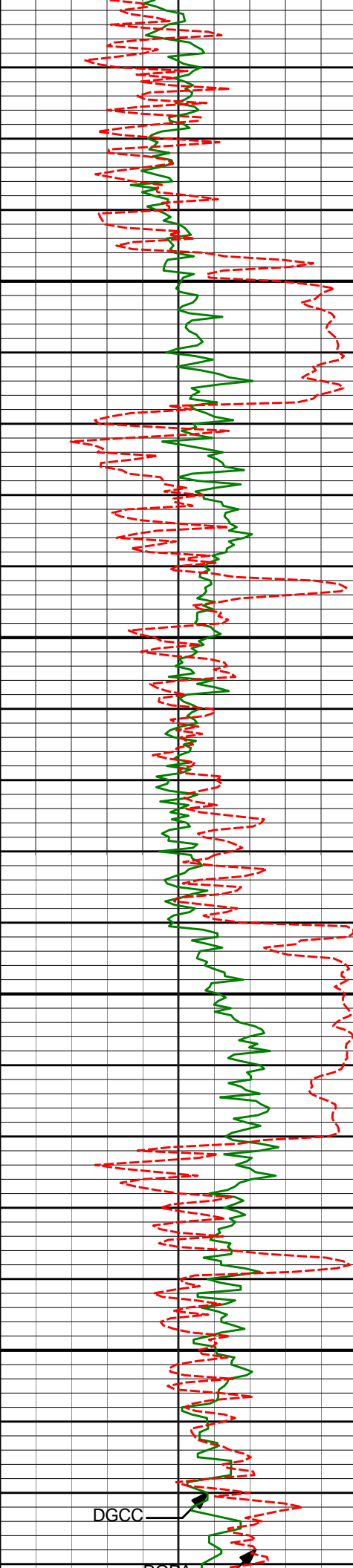
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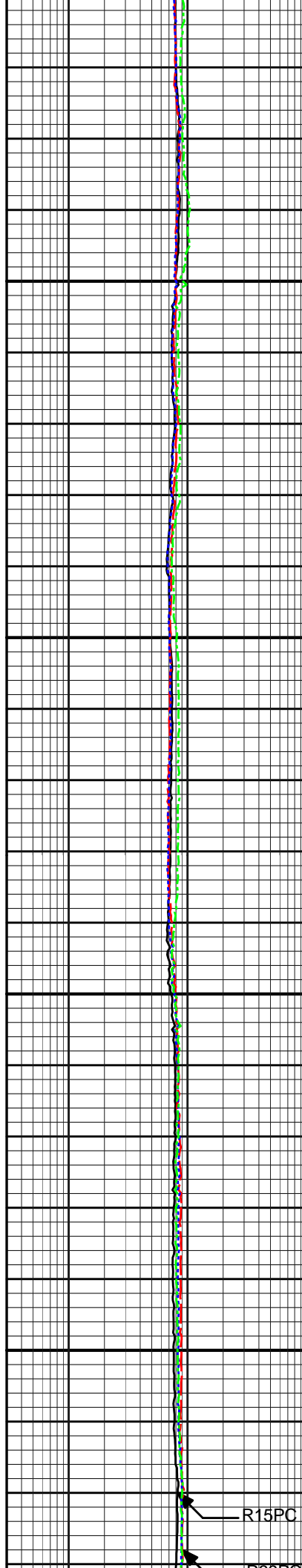
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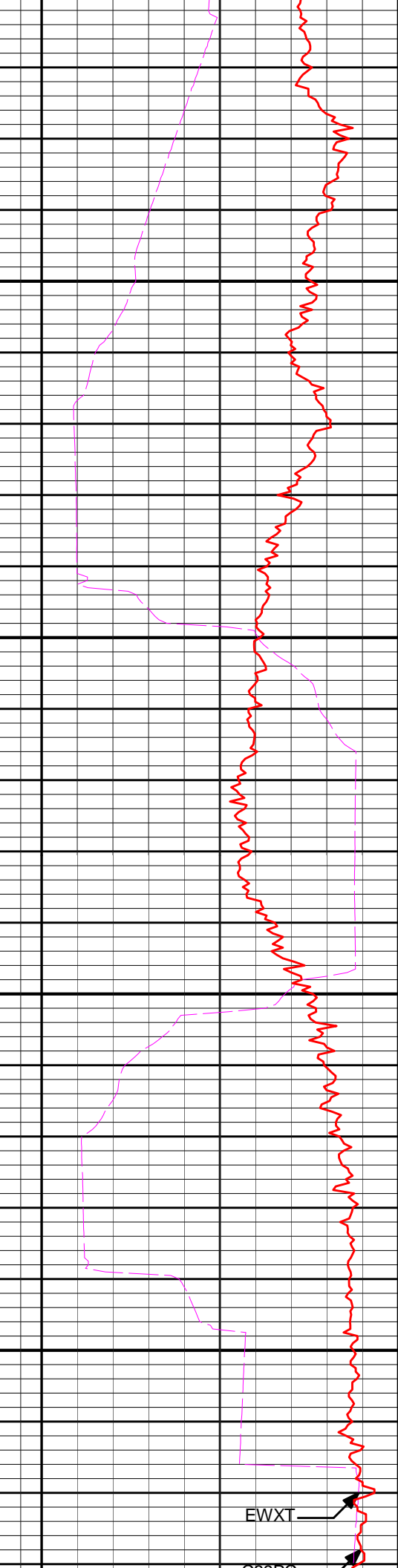
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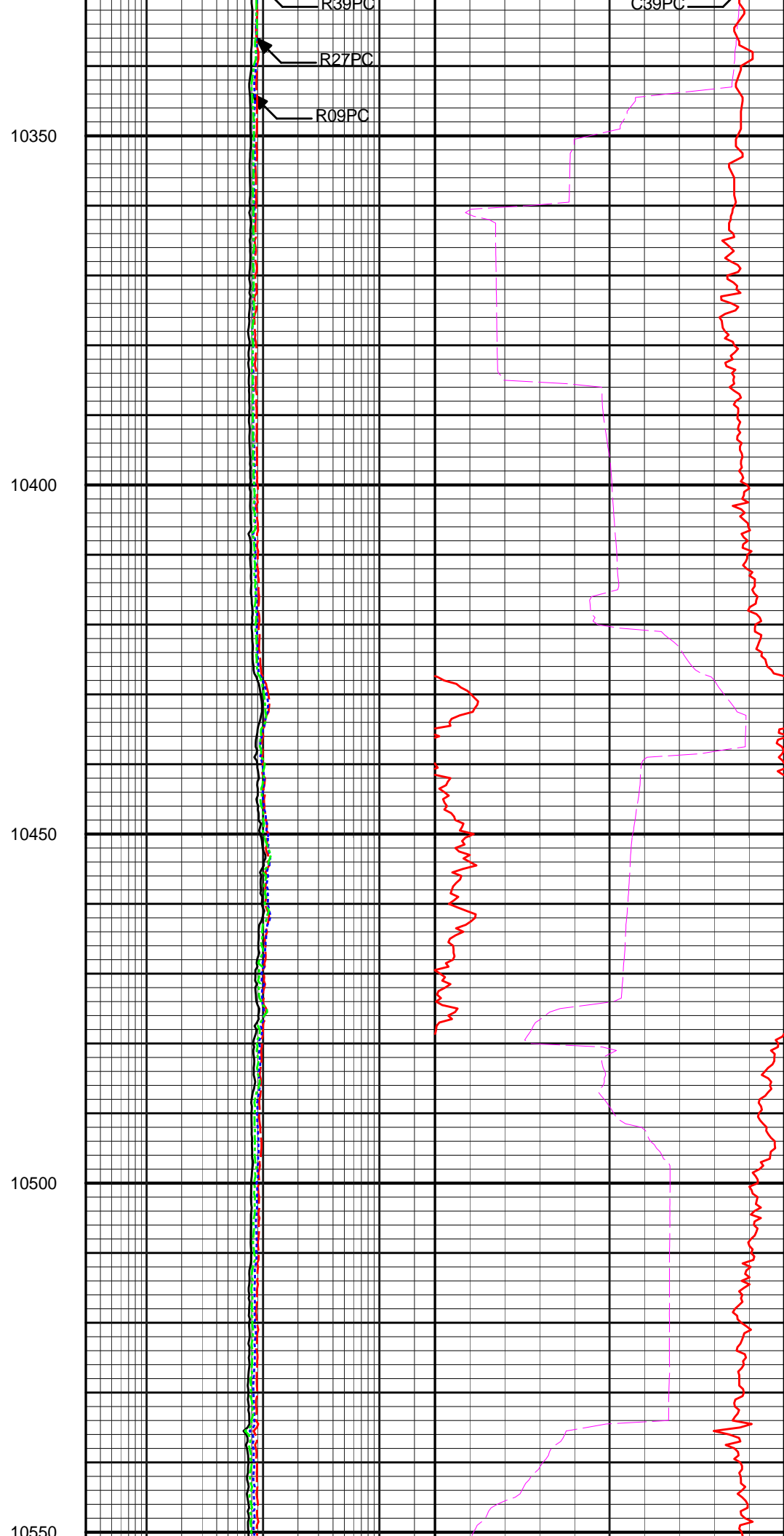
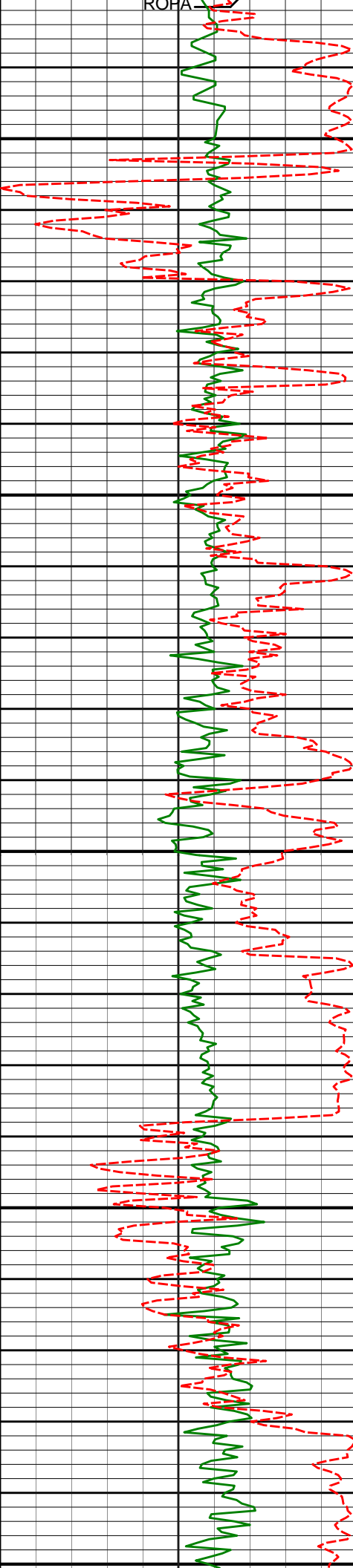
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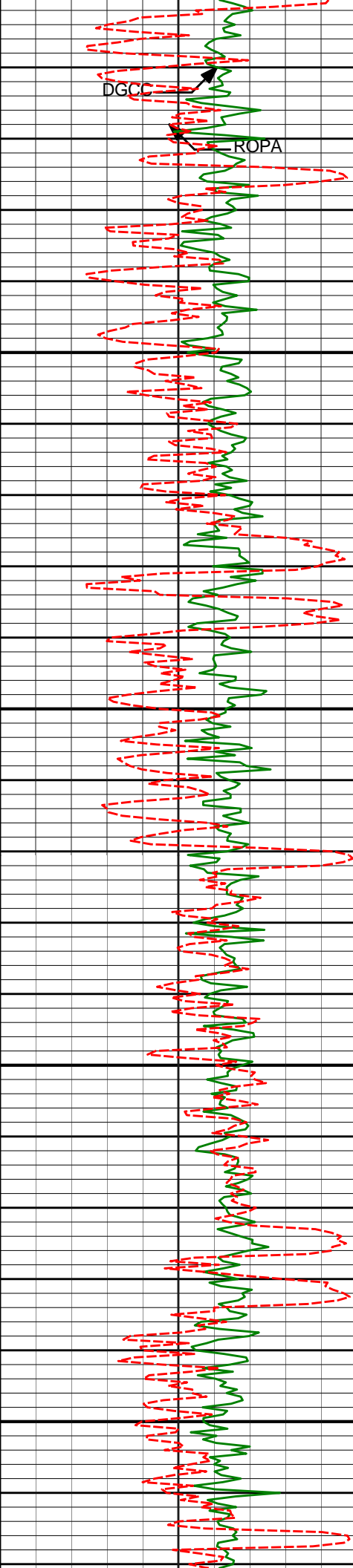


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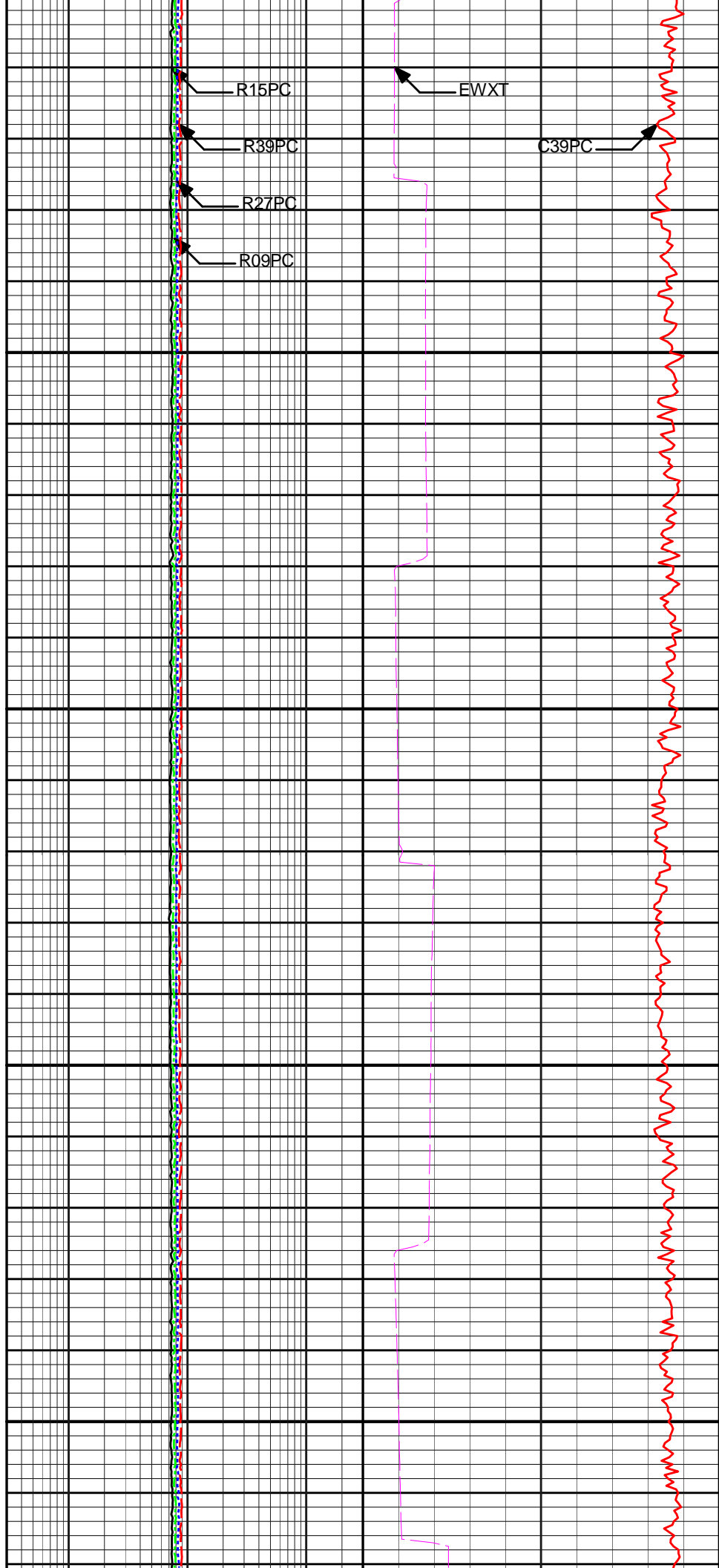


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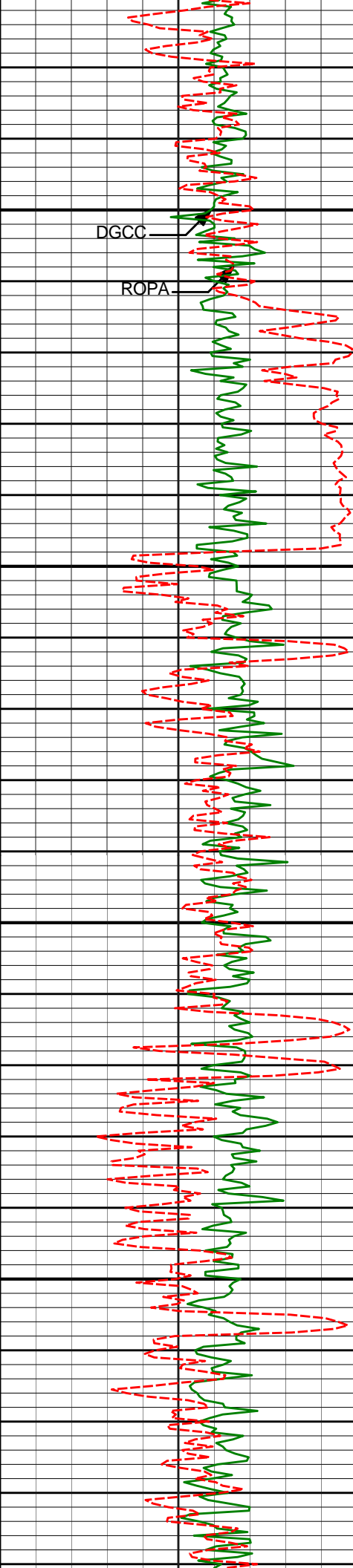


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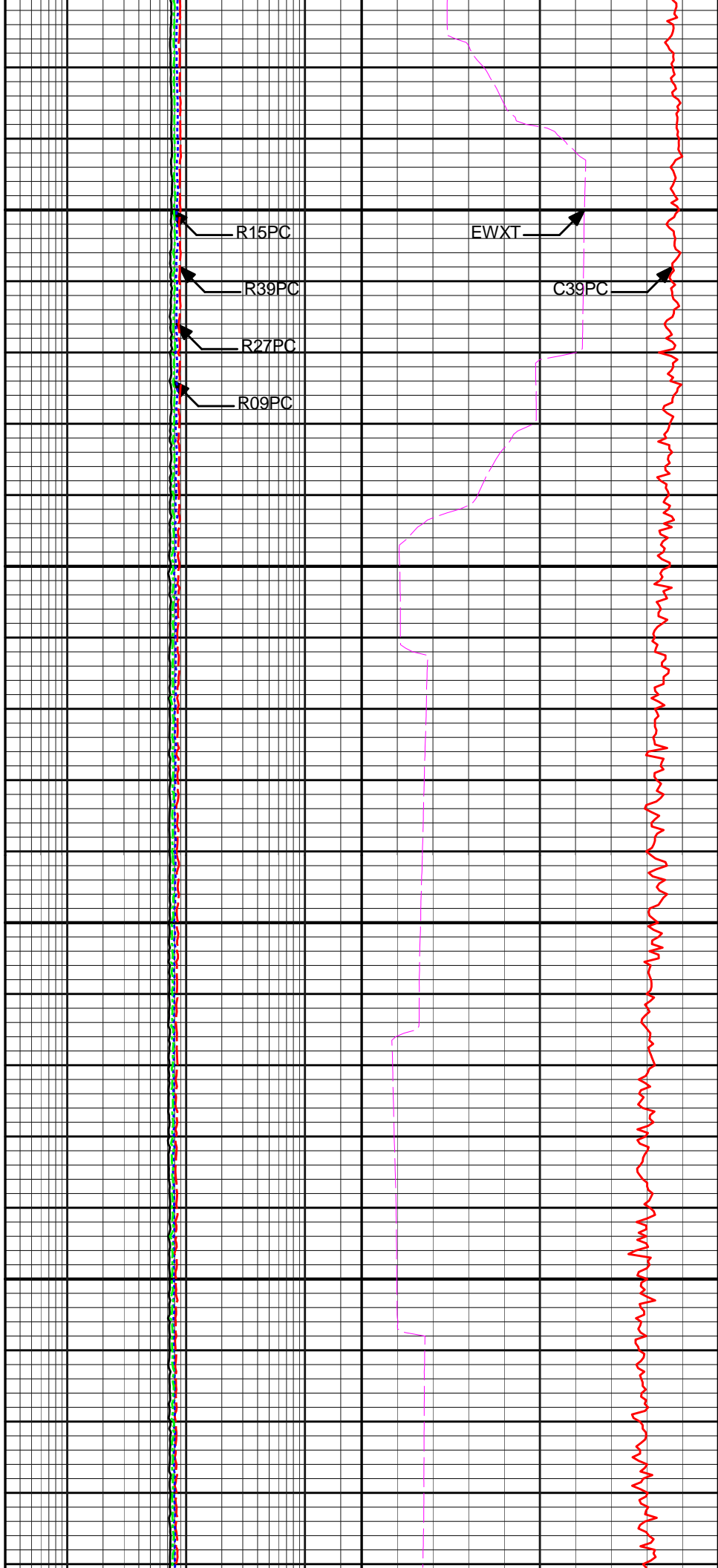


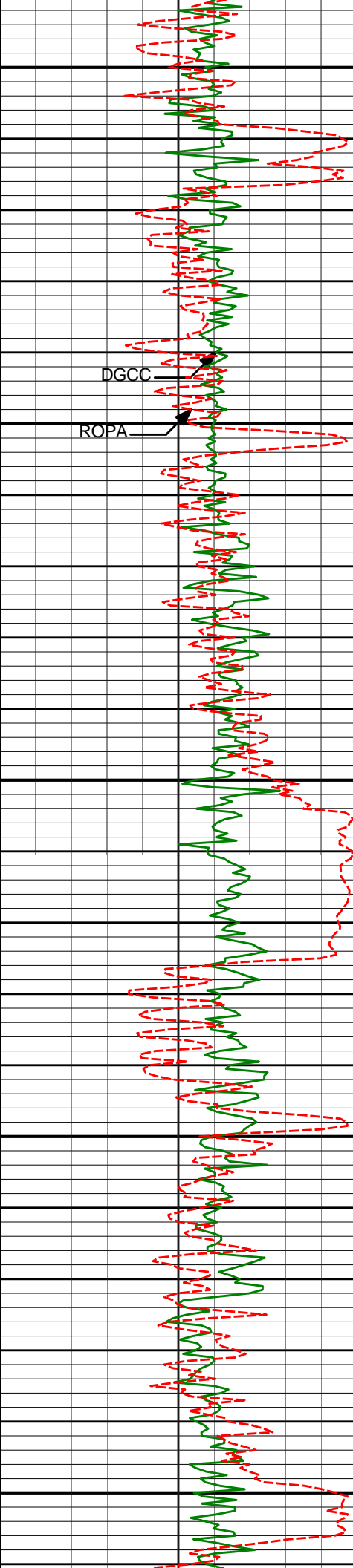
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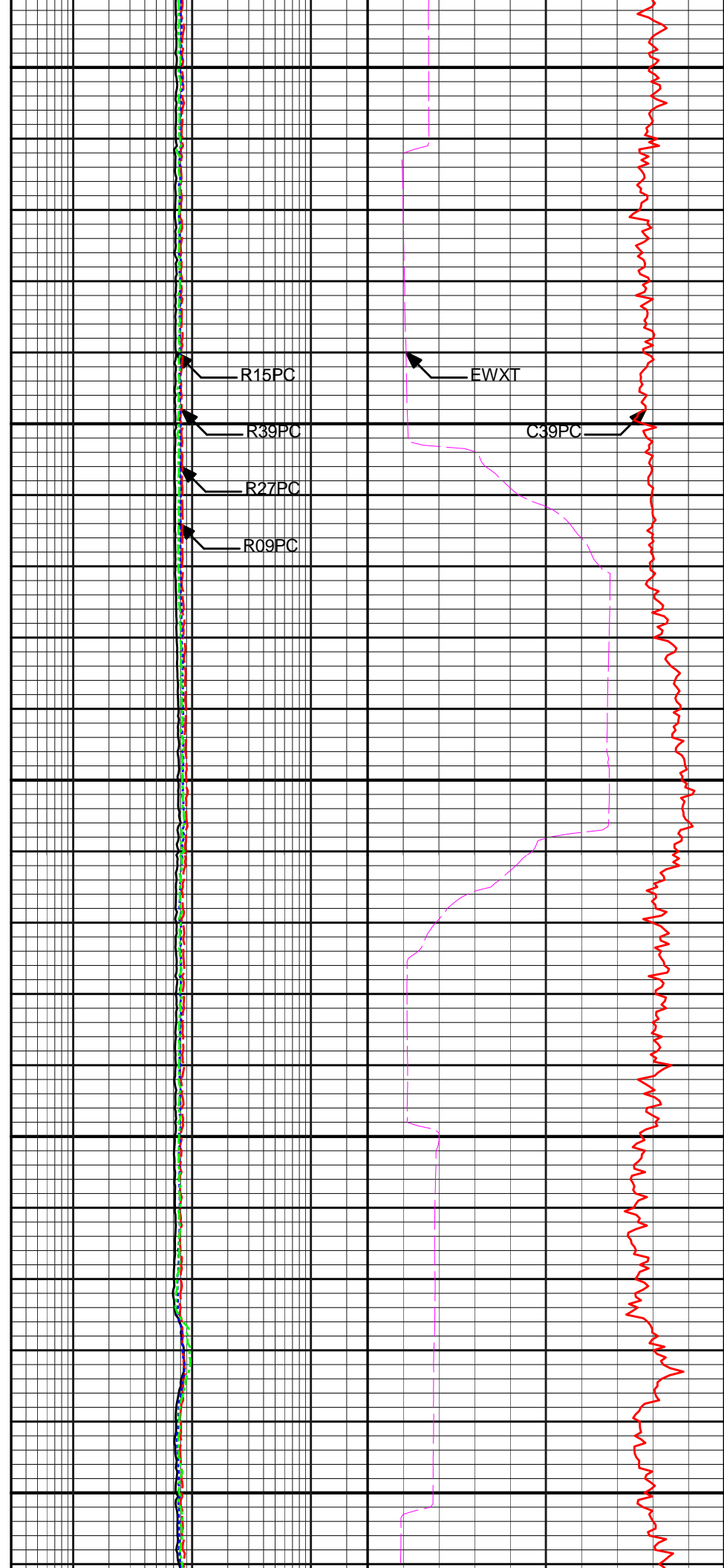
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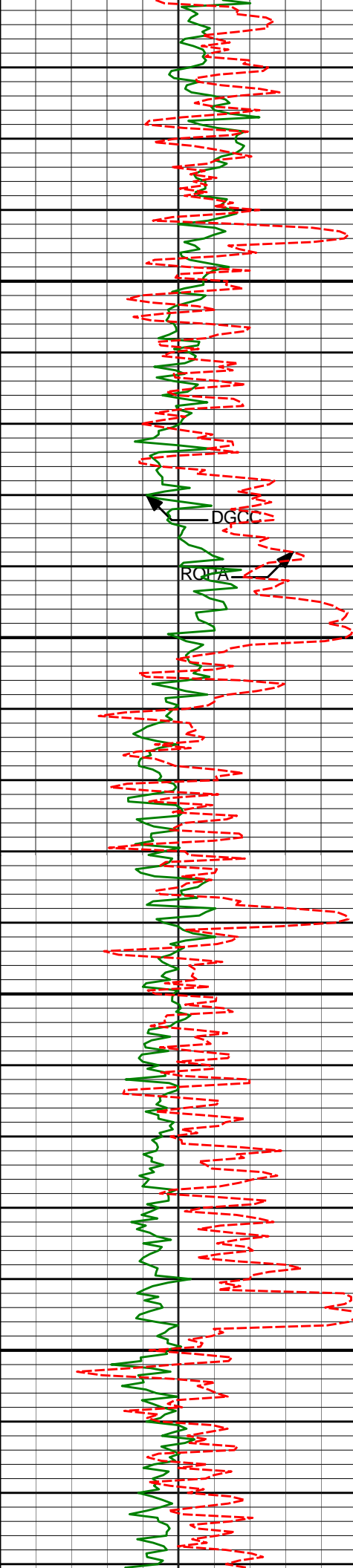
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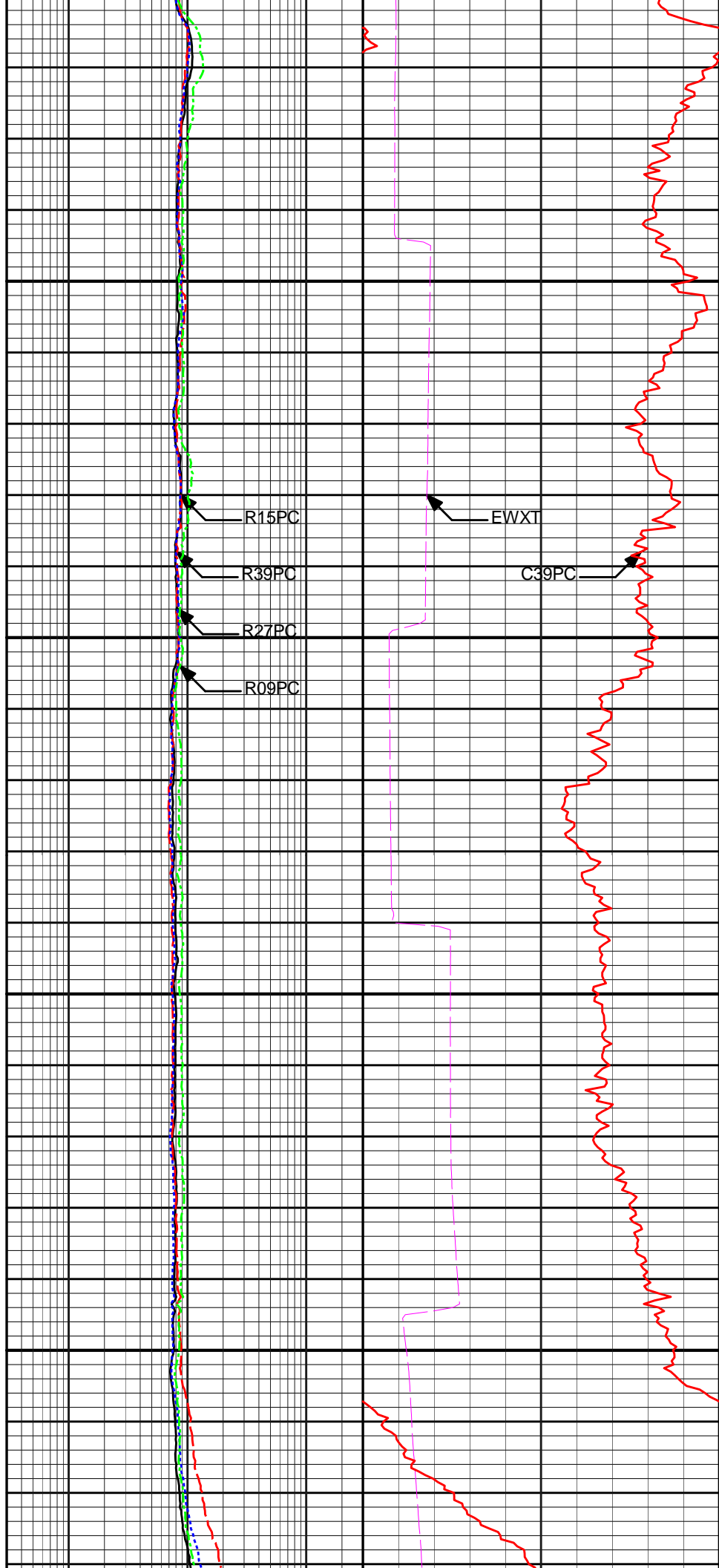
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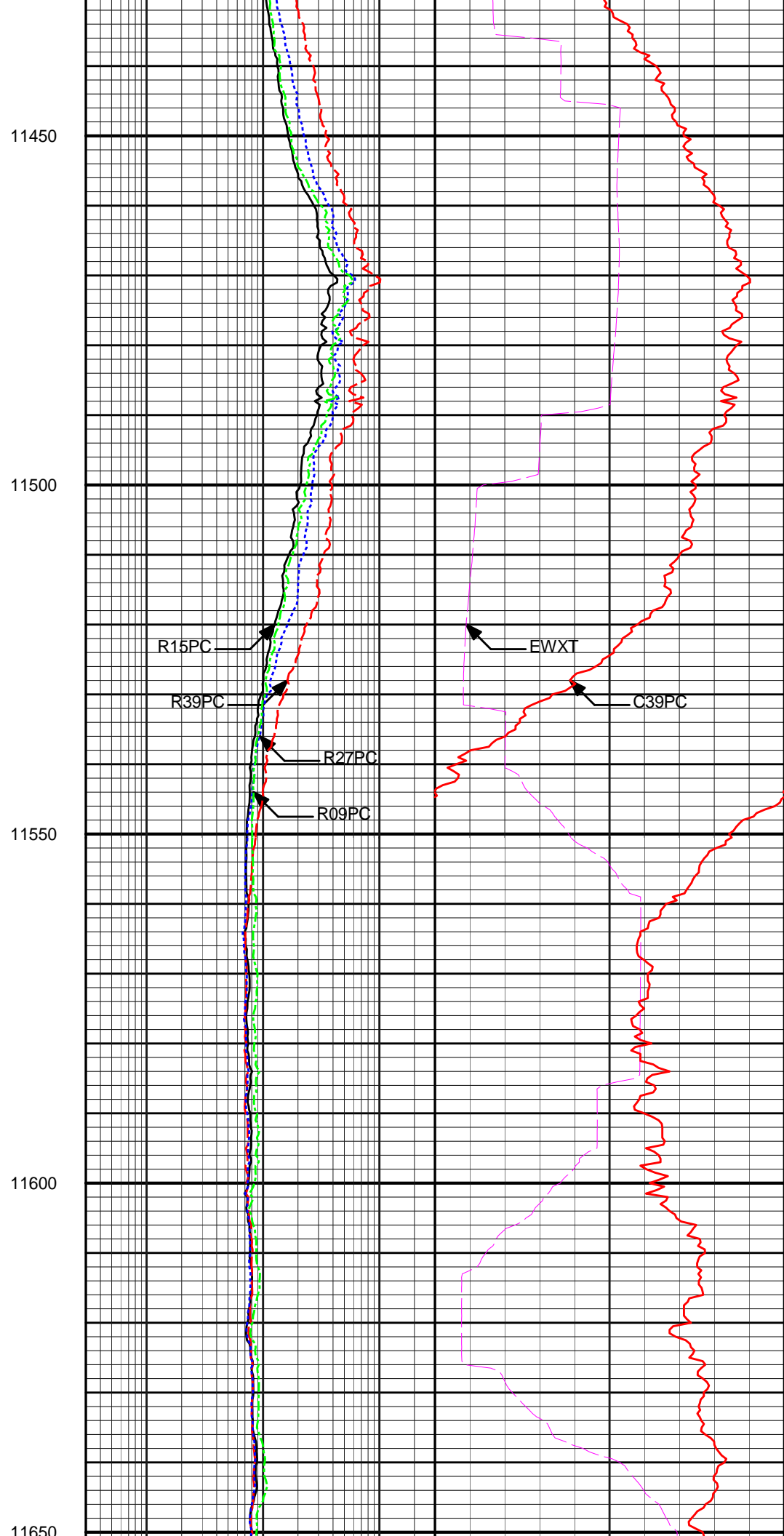
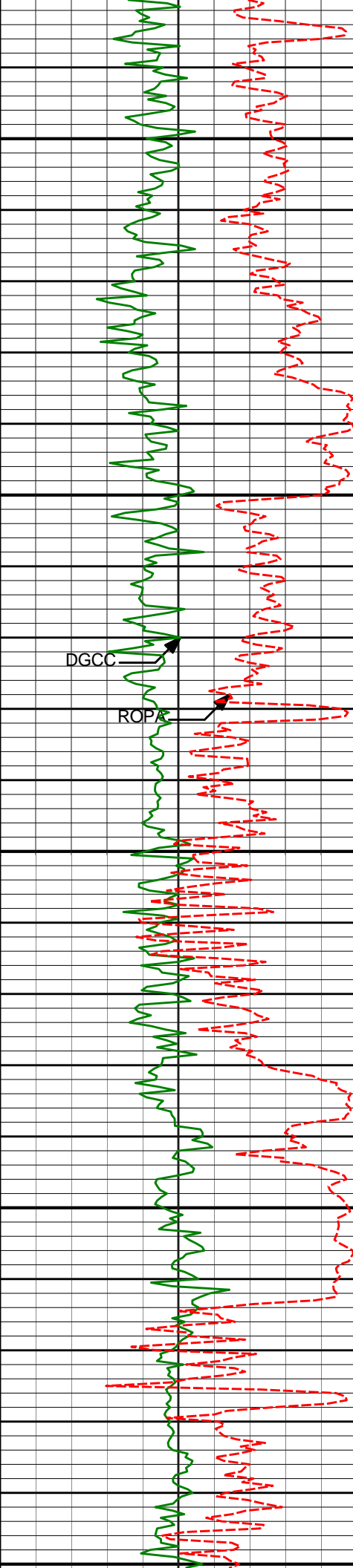
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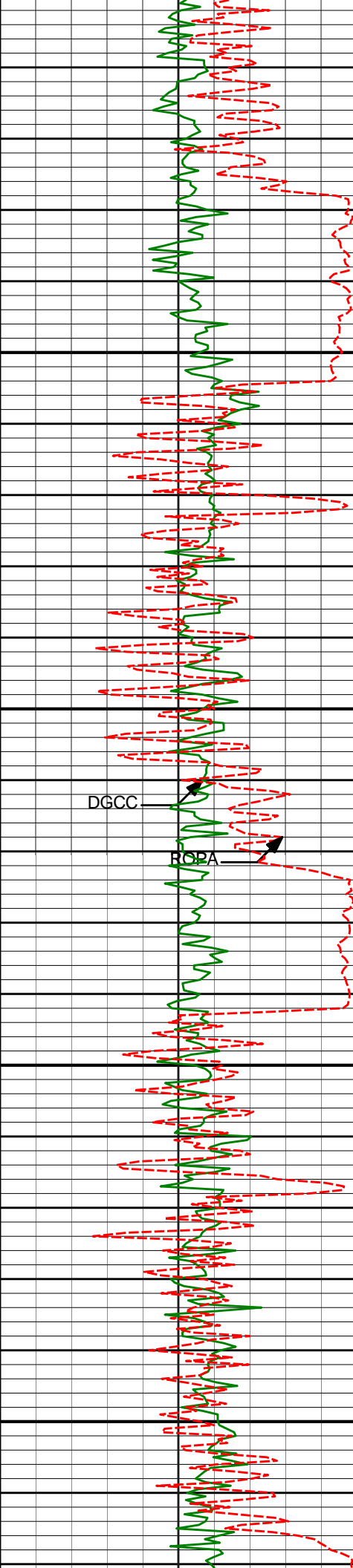
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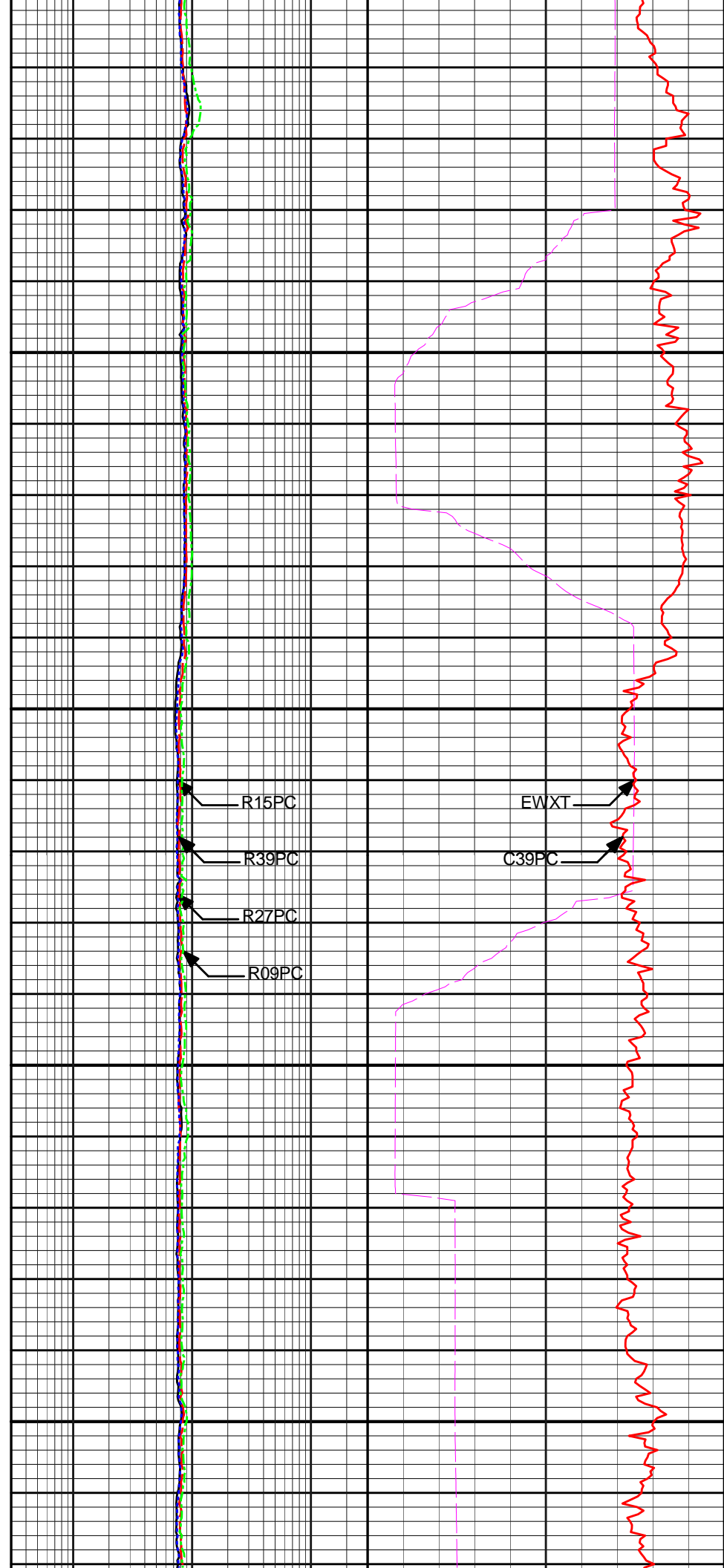
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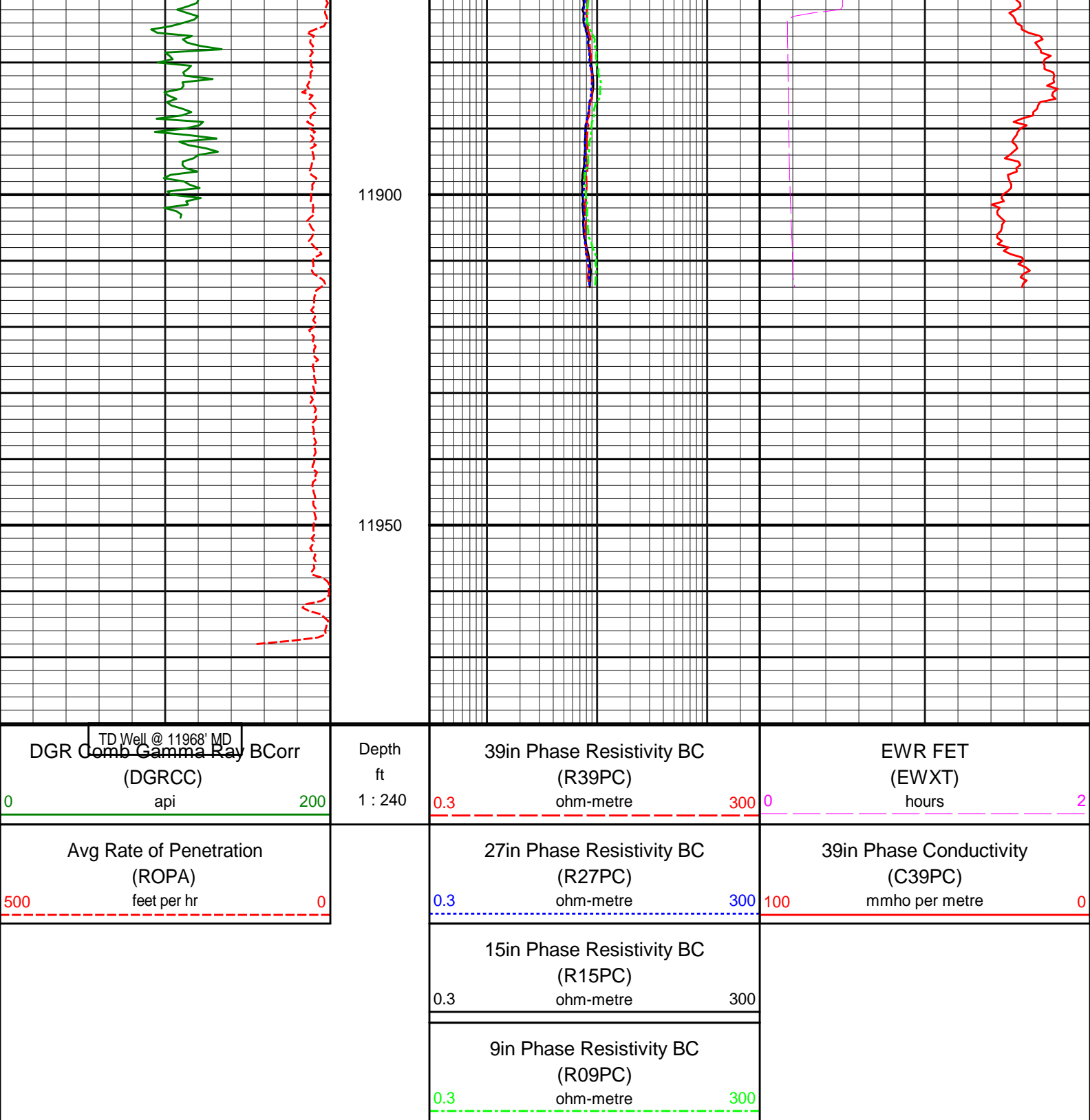
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**HALLIBURTON**

## DIRECTIONAL SURVEY REPORT

Anadarko Petroleum  
Gobbler 2C-23-HZ  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0900275968

Measured Depth	Inclination	Direction	Vertical Depth	Latitude	Departure	Vertical Section	Dogleg
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991.00	0.02	278.40	990.96	1.93 N	7.20 E	1.97	TIE-IN
1250.00	0.46	212.75	1249.96	1.06 N	6.59 E	1.10	0.17
1526.00	0.36	183.19	1525.95	0.74 S	5.95 E	-0.70	0.08
1802.00	0.33	200.38	1801.95	2.35 S	5.62 E	-2.32	0.04
2086.00	0.77	265.44	2085.93	3.26 S	3.43 E	-3.25	0.25
2373.00	0.44	331.46	2372.92	2.45 S	0.98 E	-2.44	0.25
2660.00	0.41	352.54	2659.91	0.46 S	0.32 E	-0.46	0.06
2946.00	0.45	196.97	2945.91	0.52 S	0.14 W	-0.52	0.29
3041.00	1.64	165.58	3040.89	2.20 S	0.09 E	-2.20	1.34
3137.00	2.98	173.45	3136.81	6.01 S	0.72 E	-6.00	1.43
3233.00	4.39	169.26	3232.61	12.10 S	1.69 E	-12.09	1.49
3330.00	5.17	170.19	3329.27	20.05 S	3.13 E	-20.03	0.81
3425.00	6.55	174.44	3423.78	29.66 S	4.38 E	-29.64	1.52
3520.00	5.35	177.91	3518.26	39.48 S	5.07 E	-39.45	1.32
3615.00	5.17	168.85	3612.86	48.11 S	6.06 E	-48.07	0.89
3710.00	5.12	169.35	3707.48	56.47 S	7.67 E	-56.43	0.07
3806.00	5.17	162.03	3803.10	64.80 S	9.79 E	-64.74	0.69
3901.00	5.75	173.20	3897.67	73.59 S	11.68 E	-73.53	1.27
3996.00	5.39	169.86	3992.22	82.71 S	13.03 E	-82.64	0.51
4092.00	5.80	164.32	4087.76	91.82 S	15.13 E	-91.74	0.71
4188.00	5.53	159.28	4183.29	100.82 S	18.08 E	-100.72	0.59
4284.00	6.59	162.12	4278.76	110.38 S	21.41 E	-110.27	1.15
4379.00	6.56	165.51	4373.13	120.83 S	24.44 E	-120.69	0.41
4475.00	5.65	162.29	4468.59	130.64 S	27.25 E	-130.49	1.01
4570.00	4.28	168.10	4563.23	138.56 S	29.40 E	-138.40	1.53
4666.00	4.01	174.57	4658.98	145.41 S	30.46 E	-145.24	0.56
4762.00	2.80	178.06	4754.81	151.09 S	30.86 E	-150.93	1.28
4857.00	1.63	182.35	4849.73	154.76 S	30.88 E	-154.59	1.24
4953.00	1.30	201.03	4945.70	157.14 S	30.43 E	-156.98	0.60
5048.00	0.71	226.85	5040.69	158.55 S	29.62 E	-158.39	0.77
5144.00	0.32	305.72	5136.68	158.80 S	28.96 E	-158.64	0.75
5428.00	1.14	336.80	5420.66	155.74 S	27.21 E	-155.59	0.31
5811.00	0.97	328.02	5803.60	149.49 S	23.99 E	-149.36	0.06
6193.00	1.23	3.71	6185.53	142.66 S	22.54 E	-142.53	0.19
6573.00	0.69	31.45	6565.48	136.64 S	24.00 E	-136.50	0.18
6885.00	1.26	230.05	6877.46	137.24 S	22.35 E	-137.11	0.62
6955.00	1.52	310.92	6947.44	137.12 S	21.06 E	-137.01	2.59
7003.00	8.14	1.23	6995.25	133.30 S	20.65 E	-133.19	15.13
7051.00	14.41	2.07	7042.31	123.93 S	20.94 E	-123.81	13.07
7096.00	18.91	3.78	7085.41	111.05 S	21.62 E	-110.93	10.06
7146.00	23.22	0.23	7132.06	93.10 S	22.20 E	-92.98	8.99
7194.00	26.12	0.94	7175.67	73.07 S	22.41 E	-72.94	6.07
7241.00	28.73	1.55	7217.38	51.43 S	22.88 E	-51.30	5.59
7289.00	33.02	1.98	7258.57	26.81 S	23.65 E	-26.68	8.95
7336.00	37.95	2.19	7296.83	0.44 N	24.64 E	0.58	10.49
7385.00	43.02	3.40	7334.09	32.21 N	26.21 E	32.35	10.47
7432.00	49.27	3.76	7366.63	66.02 N	28.33 E	66.17	13.31
7480.00	55.63	0.74	7395.88	104.02 N	29.78 E	104.18	14.16
7527.00	58.90	0.04	7421.29	143.54 N	30.05 E	143.71	7.07
7576.00	58.75	358.80	7446.66	185.47 N	29.62 E	185.62	2.19
7623.00	61.09	358.68	7470.21	226.12 N	28.73 E	226.28	4.98
7671.00	67.65	0.91	7490.96	269.37 N	28.60 E	269.52	14.29
7719.00	74.27	2.48	7506.62	314.70 N	29.95 E	314.86	14.13
7767.00	79.35	2.90	7517.56	361.37 N	32.14 E	361.53	10.62
7809.00	85.31	1.81	7523.17	402.94 N	33.85 E	403.11	14.42
7912.00	87.84	2.70	7529.32	505.66 N	37.90 E	505.86	2.60
8007.00	88.02	2.04	7532.75	600.52 N	41.82 E	600.74	0.72
8103.00	88.89	0.50	7535.34	696.46 N	43.95 E	696.68	1.84
8199.00	88.46	359.75	7537.56	792.43 N	44.16 E	792.66	0.90
8295.00	91.05	0.15	7537.97	888.42 N	44.07 E	888.65	2.73
8391.00	90.56	358.86	7536.62	984.41 N	43.25 E	984.62	1.44
8487.00	89.07	1.49	7536.93	1080.39 N	43.54 E	1080.61	3.15
8582.00	90.31	0.84	7537.45	1175.37 N	45.47 E	1175.60	1.47
8678.00	90.49	1.81	7536.78	1271.34 N	47.69 E	1271.58	1.03
8773.00	90.37	0.34	7536.06	1366.32 N	49.47 E	1366.57	1.55
8869.00	90.43	359.95	7535.39	1462.32 N	49.71 E	1462.56	0.41
8965.00	90.19	359.45	7534.87	1558.31 N	49.21 E	1558.56	0.58
9060.00	87.77	357.86	7536.56	1653.26 N	46.98 E	1653.49	3.05
9155.00	88.08	358.88	7540.00	1748.16 N	44.28 E	1748.37	1.12
9251.00	87.47	358.38	7543.73	1844.06 N	41.99 E	1844.26	0.82
9346.00	89.44	357.97	7546.29	1938.97 N	38.96 E	1939.15	2.12
9442.00	89.57	359.20	7547.12	2034.94 N	36.59 E	2035.10	1.29
9537.00	89.26	0.21	7548.09	2129.93 N	36.10 E	2130.09	1.11

9633.00	89.07	359.13	7549.49	2225.92 N	35.55 E	2226.08	1.14
9729.00	89.63	359.89	7550.58	2321.90 N	34.73 E	2322.06	0.98
9824.00	90.74	1.63	7550.27	2416.89 N	35.99 E	2417.05	2.17
9919.00	91.30	1.37	7548.58	2511.84 N	38.48 E	2512.01	0.65
10015.00	89.88	0.96	7547.59	2607.82 N	40.43 E	2608.00	1.54
10111.00	87.28	0.28	7549.97	2703.77 N	41.47 E	2703.96	2.80
10206.00	88.33	0.86	7553.61	2798.70 N	42.41 E	2798.88	1.26
10302.00	90.31	0.19	7554.75	2894.68 N	43.29 E	2894.87	2.18
10397.00	90.49	0.66	7554.09	2989.67 N	44.00 E	2989.87	0.53
10492.00	91.36	0.08	7552.55	3084.66 N	44.61 E	3084.85	1.10
10588.00	91.61	0.97	7550.07	3180.62 N	45.49 E	3180.82	0.96
10683.00	90.93	0.49	7547.96	3275.59 N	46.70 E	3275.79	0.88
10778.00	90.87	0.71	7546.47	3370.57 N	47.69 E	3370.78	0.24
10873.00	90.99	1.99	7544.93	3465.53 N	49.93 E	3465.75	1.35
10969.00	90.49	2.19	7543.69	3561.46 N	53.43 E	3561.70	0.56
11064.00	89.57	1.65	7543.64	3656.40 N	56.62 E	3656.66	1.12
11160.00	91.11	1.88	7543.07	3752.35 N	59.57 E	3752.62	1.62
11256.00	90.99	1.49	7541.31	3848.30 N	62.39 E	3848.58	0.42
11351.00	91.24	1.08	7539.46	3943.25 N	64.52 E	3943.55	0.51
11446.00	89.14	359.92	7539.15	4038.24 N	65.35 E	4038.54	2.53
11542.00	85.42	358.21	7543.70	4134.10 N	63.79 E	4134.39	4.26
11637.00	87.03	357.87	7549.95	4228.84 N	60.55 E	4229.10	1.73
11733.00	88.33	358.15	7553.84	4324.70 N	57.22 E	4324.94	1.39
11829.00	91.42	359.54	7554.05	4420.66 N	55.28 E	4420.90	3.53
11927.00	91.85	358.82	7551.25	4518.61 N	53.88 E	4518.84	0.86

**CALCULATION BASED ON MINIMUM CURVATURE METHOD**

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT  
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD  
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 0.31 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.63 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11927.00 FEET  
IS 4518.93 FEET ALONG 0.68 DEGREES (TRUE)**

**All surveys are magnetic In-Field-Referencing (IFR) corrected.  
Final survey is a projection to TD.**